May - June, 1956

MOTOROLA newsgram

Bi-Monthly Publication of Motorola Inc.
Communications and Electronics Division.

In this issue . . . "Don't yell; broadcast!" is the slogan of survey crews in Red Mountain mining community . . . See page 16

THE OLD GIVES WAY TO THE NEW

D. E. NOBLE

The carbon microphone is a remarkable device. It has given yeoman service in the telephone field and in radiotelephone communications for many years. It has served as a simple and practical transducer which made intelligible voice communications possible, even though the quality of voice reproduction was not particularly pleasant. The three basic faults of the carbon microphone are high noise level, poor quality of reproduction, and the tendency toward carbon packing. Now at last, the dominant position of the old carbon transducer has been successfully challenged.

Has it ever occurred to you that if a group of qualified engineers who had never heard of such a thing as a carbon microphone were to gather together for the purpose of designing a microphone, that within the context of the modern electronic art they would never consider such a crude approach to the problem as that provided by the variable pressure on carbon granules activated by sound waves impinging upon a diaphragm. I would venture to say that, if an engineer in such a conference suggested the carbon pressure contact design, his colleagues would kick him out of the conference. In terms of the present state of the art, the carbon microphone is a crude agricultural device. The advent of the transistor heralds the doom of the carbon microphone, and even though carbon mikes will be around for a few more dozen years, I am confident that they are on the way out.

In our Motorola Communications & Electronics Division laboratories, we have been studying magnetic microphones teamed with transistors ever since the first point contact transistors became available. We have made and tested many forms of magnetic, reluctance and dynamic microphones before settling upon the immensely practical design we are now offering as a superior substitute for the carbon mike.

In the course of our experiments, we definitely ruled out the use of the reluctance microphone, and I thought you might be interested in knowing why. We made up a number of reluctance units and, at first, we put the pre-amplifier on the transmitter chassis. The microphone output at extremely low signal level passed through the mike cable and the connections all the way to the transmitter, making the entire system vulnerable to electrical noise pickup. The generator noise and the current pulses for the ignition coil put an annoying racket on the carrier.

Next, we put the transistor amplifier directly in the microphone case to raise the level of signal transmitted to the cable. This didn't solve the problem. Further check disclosed a characteristic of the reluctance microphone, which is perfectly obvious when you check the construction. The reluctance microphone by its design is an excellent stray magnetic field detector. If we had been interested in developing a device to locate weak magnetic fields, the reluctance microphone would have served effectively. Because of this sensitivity to stray fields, we didn't consider the reluctance microphone with the built-in transistor amplifier as a satisfactory unit. Our attempts to build in magnetic shields proved to be impractical and we finally threw out the reluctance mike approach in favor of the dynamic microphone, which, by the nature of its construction, offers for all practical purposes adequate built-in shielding from stray fields. The dynamic unit costs a little more to manufacture, but it is a rugged unit with superior quality of voice reproduction.

While I had listened to the experimental models of the dynamic mobile mike from time to time, the improved quality of the unit was emphasized sharply during a test the other day. As usual, when I started driving to work in the morning, I turned on my mobile equipment and called the base station. A reply came back promptly. Because the voice quality of the transmission replying to my call was so well rounded and high in intelligibility without the usual cranky sound of the carbon microphone, I automatically assumed that the base station had replied. I was suddenly shocked to attention when I discovered that the reply had come from another mobile unit about three miles away. A bit of conversation over the air with Fred Hilton, who was driving the other car, disclosed that he was using the first new dynamic microphone off the production line. I grabbed the opportunity immediately to check the device over the air and I had Fred, successively, shout into the microphone while it was held up close, talk softly with the microphone at a distance, expose the microphone to heavy ambient noise while talking, and talk normally under conditions where the transmission path was poor and heavy noise background was reproduced in my receiver. The results were truly exceptional. There is no doubt in my mind that the new Motorola dynamic microphone outclasses the old carbon on every point. I am really proud to offer such an excellent unit to our friends in the mobile radio field.

As you know, the dynamic microphone is also a dynamic loudspeaker. While our design was primarily aimed at the development of a superior microphone, we found that the unit performed very well as a speaker. It is certainly logical to keep the source of sound up near the ear instead of hiding it down under the instrument panel, where the sound mixes with the motor noise and other noises in the car. With normal operation requiring you to hold a microphone in your hand, there are advantages in having the microphone double as a loudspeaker, so that the sound source thus brought up out of the hidden places can make listening pleasant and easy. The sound level is high enough so that it works well on the instrument panel. Of course, a little dynamic speaker isn't as efficient as the larger, generously designed loudspeaker, but the superior location and reduced transmission path tends to equalize the efficiency factors for the two speakers.

Dan Noble

The
MOTOROLA
NEWSGRAM

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Communications and
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FEATURES

GONE: Cab Radio Racket. 4–5
ROXY: Good Investments And Good Neighbor. . . . 6–7
Power Radio Improves With Constant Use 8–9
Mobile Radio Builds Shipper Confidence 10–11
Put Mobile Radio To Work For Greater Plant Safety 12–13
Radio Rules At Navy Supply Center 14–15
Standard Equipment For Survey Crews 16
Radio Speeds Beer Deliveries 17

PHOTO GALLERY

Quality Control Is The Difference Between Parts. . 18–19

TECH NOTES

Type Acceptance And Type Approval 20–21
Service Hints And Shop Notes 22–23
FCC Bulletins 24
New Products:
100 Watt Mobile Unit; Portable Accessories . . . 25
Color TV Relay. 26–27
PRIVATE LINE Radio. . . . 28–29

NEWS

Late News 3
Transmissions And Inside Motorola 30
Sales Directory 31

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CAA Plans Microwave Link For Air Traffic Control Evaluation

The Civil Aeronautics Administration will soon be electronically gathering air traffic information at Indianapolis from widely separated radar stations in Indiana and Ohio.

Daniel E. Noble, vice president in charge of Motorola's Communications and Electronics Division, recently announced the award of a $444,000 contract from Rome Air Force Depot for a 100-mile microwave radar relay system connecting Dayton, Ohio and Indianapolis, Indiana. The CAA will use this system to develop and evaluate techniques and procedures for improvements in air traffic control.

The development program will be under the supervision of the Airways Operation Evaluation Center, a laboratory of the CAA's Technical Development Center, located at Indianapolis. AOEC will be assisted in its efforts by the work of the Traffic Approach Control and Landing Systems office of the U. S. Air Force's Air Research and Development Command.

The microwave system will collect air traffic information from a radar network in the northern half of the Indianapolis Air Route Traffic Control Center area, a zone about 400 miles long and 150 miles wide. This system will tie in with an existing microwave network originating at the U. S. Air Force Base in Jamestown, Ohio. It is expected that the radar collection system will be expanded at a later date to obtain data from the Bellefontaine, Columbus, and Cincinnati areas of Ohio.

In addition to the radar transmission feature, the link will also provide a high capacity two-way communication system which will be used to control peripheral air-to-ground communication equipment, and which will, in the future, provide for transmission of automatically collected and processed information on air traffic movements. It will be a major tool in closer civil/military coordination in air traffic control development. » » »

HANDIE–TALKIE RADIO SAVES 3 AS HELICOPTER LANDS IN GULF

A small portable 2-way radiophone was credited with bringing timely aid to three men when a helicopter lost suspension and wind-milled into the Gulf of Mexico more than 25 miles off the Louisiana coast recently (June 11).

The aircraft, owned by General Air Transport of Louisiana, was carrying two passengers in addition to the pilot, and was en route from an off-shore drilling rig to Morgan City, Louisiana, 70 miles away, when the mishap occurred.

Although it had lost its power, the helicopter made what was described as a safe, controlled landing by means of auto-rotation of its blades. It settled into the water and remained afloat in heavy seas until a rescue boat from the rig reached it. As it descended the men radioed to the rig with their Motorola HANDIE-TALKIE radiophone.

Officials of the Sinclair Oil & Gas Company, operator for the group which includes Peoples Production Company, El Paso Natural Gas Company and Sohio Petroleum Company, said there is no doubt that the three men were saved undue exposure by 2-way radio, since the aircraft landed in 5-foot waves in a remote section of the Gulf, far out of sight of the drilling rig and many miles from shore.

The radio unit was aboard the helicopter in compliance with the operator's rule requiring a HANDIE-TALKIE radio operating on the Company's assigned channel be carried on each flight. A Bell helicopter and new Motorola HANDIE-TALKIE radio were immediately ordered to replace the salvaged equipment. » »

Southside Cab driver explains operation of new "quiet radio" to a rider.

GONE... CAB RADIO RACKET!

PRIVATE LINE Radiophone—an entirely new Motorola development—Offers Triumph over Channel Chatter in Taxi and Truck Operations.

Taxi operators and truck lines today are vitally interested in a revolutionary new development in 2-way radio—PRIVATE LINE Radiophone—on which field testing began just two years ago at Southside Cab Co. in Chicago.

Just recently announced, this new development effectively provides both dispatcher and drivers with *private,* interference-free communications at all times — even when other taxi or truck companies in the same locality are operating their radio systems on the same frequency.

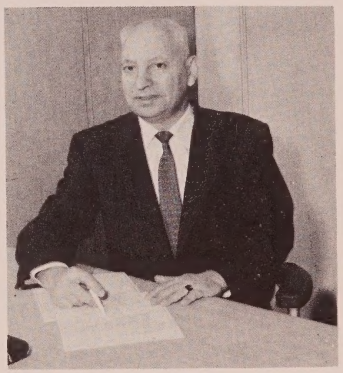
This means an end to the annoying, repetitious loudspeaker "noise" that comes from the involuntary reception of unrelated calls. No longer is it necessary for the cab driver, the passengers, and the dispatcher back at the office to listen to a constant stream of messages transmitted by other taxi companies sharing the same radio frequency. The driver hears nothing but the calls transmitted by his own dispatcher who, in turn, hears nothing but the calls from his own mobile units. The rest of the time all loudspeakers are quiet.

PRIVATE LINE radiophone is completely automatic . . . there are no special buttons to push. It is operated the same as any standard cab radio. The conventional control head squelch adjustment has been eliminated, and in its place is a two-position switch that disables the coded squelch to test receiver operation. This is psychologically desirable because the receiver is so quiet that the driver may want to make sure it is still working after long periods with no transmissions in the system.

There is very little need for such testing at Southside Cab Co., however. This organization keeps the radios busy constantly, operating cabs under the names Highland Cab Co. and Elizabeth Hall Cab Co. It has a total of 42 vehicles making as many as 1,200 pickups in a 24-hour period.

This high level of activity is only one reason why the selection of Southside Cab for the first major test installation of Motorola PRIVATE LINE radiophone was a particularly fortunate one. A more important reason is that there are 25 other cab companies operating on the same radio channel in the same metropolitan area —enough to offer the severest test of the effectiveness of this new "quiet radio."

Anyone who knows anything at all about taxi radio can well imagine the intense interference and congestion caused by so many transmitters operating on the same channel. Even the old-timers at Southside Cab could never fully accustom themselves to the ear-splitting racket that went on hour after hour without let-up . . . and still does, in hundreds of other cab companies in Chicago and other metropolitan areas throughout the country.



Mr. Carmine Rocco, Secretary-Treasurer, Southside Cab Company, Chicago.

With the first fleet-wide installation of PRIVATE LINE radiophone this long-standing problem of superfluous radio noise ended abruptly. Veteran cabman

Carmine Rocco, who is Secretary-Treasurer of Southside Cab Co., describes the new development as "revolutionary," adding:

"One of the biggest irritating factors connected with taxi operations has been removed by this new radio."

Technical radiomen will be quick to note that PRIVATE LINE radio is *not* a conventional selective signaling system. It does not employ the usual audio tone pulse selective calling techniques. It is instead a *continuous,* inaudible, coded carrier system rendering all receivers in the system completely immune to *audible* interference from local or skip co-channel signals of capturing signal strength levels. Its performance is not even remotely duplicated by any other type of radio system now in existence. The adjustable noise compensated squelch circuit has been completely eliminated and replaced by a new and exclusive Motorola development, a continuous tone-coded squelch circuit. Functionally, this circuit mutes the receiver audio except when receiving an on-channel carrier upon which is superimposed a continuous tone of the proper precision frequency.

The benefits of PRIVATE LINE radiophone stem from the reduction in radio traffic noise.

First are the psychological benefits, both to those who actively use radio communications and those who work where they can hear the radio, the telephone operators in the dispatching room, for example. They include:

1. Less fatigue
2. Fewer errors
3. Greater job satisfaction

Next come what might be described as economic benefits to the company itself. Because drivers, dispatchers, telephone operators and others suffer less fatigue working in a relatively quiet environment, overall efficiency is raised. Fewer errors mean more productive utilization of time . . . fewer repeats of radio messages . . . and more dispatched cabs per hour, a real advantage during peak load periods.

(Above) Once a bedlam of noise and confusion, this dispatcher's room at Southside Cab Company is now calm and quiet, thanks to Motorola PRIVATE LINE radiophone.

(Right) The new Motorola PRIVATE LINE radiophone, under the dash, has the same size and appearance as the standard radio which Southside Cab Company used for many years.

PRIVATE LINE radiophone is as simple to service and maintain as standard Motorola radio. Shown here is Jerry L. Rocco, Superintendent of Radio Maintenance for the Southside Cab Company.

ROXY:

GOOD INVESTMENT AND GOOD NEIGHBOR

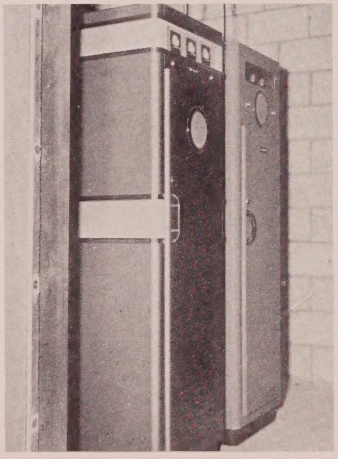
Woodland radio system sets example for conservation groups.

When heavy machinery, such as this bulldozer, breaks down, loggers in the Southern Oregon forest use two-way radio to obtain repair parts quickly.

If Uncle Sam ever goes searching for a perfect example of a radio licensee fulfilling its "public interest, convenience and necessity" requirements, Oregon should win hands down with Radio Roxy.

Technically, Roxy is Radio Station KOB-320, the private 2-way communications network of the Southern Oregon Conservation and Tree Farm Association. Actually, Roxy is much more than a good business investment—it comes pretty close to being the heartline of Jackson County, Ore.

Roxy came into existence as the nation's first cooperative industrial radio station. Its purpose has been to fill the communications gap between Medford and the wooded hills surrounding the valley—beautiful, rough country which doesn't lend itself to stringing of telephone lines.



Radio Roxy's main station (left) broadcasts to mobiles on 153 mc, is remotely controlled from Medford, 6 miles away, by a 72 mc link.

Roxy went on the air with 30 mobile radio sets spread among 20 mill and logging companies. The job of central station operator was taken on by Lewis L. "Doc" Simpson, secretary-manager of the conservation group.

Radio users quickly found the 2-way communication facility was paying for itself in time saved. Messages which previously had to be carried person to person began to flash through the air, eliminating miles of driving over mountain trails. Cutting crew wages started to reflect time on the job instead of non-productive travel and stand-by time.

The lumbermen count on radio for these important uses:

1. Administrative messages—orders to field crews, locating key supervisory personnel, ordering fuel and parts, answering questions of easements and contracts.
2. Fire alarms—vitally important to the woodsmen, particularly from April to November.
3. Aid for the injured—doctors and ambulances called out, hospitals and relatives alerted, blood donors located, first-aid advice given.
4. Public safety—impassable roads, auto accidents on remote highways, persons missing in the woods.
5. Anxiety messages—men unexpectedly delayed in the forest often radio word to their families via Roxy, ending their worry.

In five years the Roxy FM radio network has grown from 30 to 80 mobile units, plus five portable land stations scattered among the camps and sawmills, and several "Handie-Talkie" battery-powered portable radiophones.

A man carrying a portable radiophone can penetrate forests where a car could never go, and woods emergencies don't always follow the roads.

Take the time 5-year-old Ernie Leffler wandered off from his picnic crowd and was lost in the woods for almost 30 hours. Roxy mobiles and packsets were pressed into action to coordinate the more than 200 searchers. Other radio users kept silent so as to clear the Roxy channel for search messages. Some said they could hear the cheering all over Jackson County when Roxy radioed the word that the boy had been found.

The times when Radio Roxy has performed public service far beyond the immediate needs of the logger members are almost countless. There was the time when a woodsman's wife needed a transfusion of blood not available through hospital sources. An appeal was broadcast at the request of the Magnolia Lumber Company, and several replies came back to fill the need.

Late in 1950 two elderly persons were struck by an auto as they crossed a rural highway. E. R. Cox, driving by the scene in a radio-equipped truck, called Roxy

Lewis L. "Doc" Simpson keeps in constant touch with Radios Roxy and Sexton with the two-frequency radio set in his business car.

After office hours, "Doc" Simpson, his wife, son and oldest daughter operate the Radio Roxy base station at his home in Medford, Ore.

for help and an ambulance was soon on its way to the accident.

On another occasion four freight cars jumped a derail switch and left a siding, blocking the Southern Pacific main-line tracks north of Medford. A logger, Roy Bailey, saw the derailment and radioed this information to Simpson in his car. Simpson rushed to the Southern Pacific station and notified the agent, who immediately dispatched a switch engine to clear the track. Thus, a possible tragedy was averted by Roxy.

As Radio Roxy's service to the public and to the loggers became known, the number of user-members increased until now there is a waiting list of companies ready to join Roxy if an old user drops out. Eighty mobiles comprise a full system, however, and association directors feel no more companies can be accommodated. For this reason, the mobile radios are closely controlled and a withdrawing member may sell his units only to a company approved by the board.

Roxy has attracted wide industry interest among loggers in other sections of the nation. Even among the membership of SOCTFA living outside the coverage of Roxy there has been seen a need for a similar radio co-operative, and as a service to its members northwest of Medford the conservation association is now operating a second radio network about 30 miles from Roxy, with the base station located atop Sexton Mountain. Some 20 companies using 50 mobile stations make up the Sexton network.

Day in and day out, the co-operative radio systems carry scores of messages of importance only to the company involved—that is, between a supervisor in the forest and his company office in Medford or Grants Pass. But there's one word—"FIRE"—which instantly takes priority over all other messages because in the woods, anybody's fire is everybody's fire.

Most loggers have their own water tank trucks and tractors which can be rushed into the fire areas as needed. Thus, with the aid of the federal and state forest services, the loggers can call in the help of some 600 fire fighters, backed by a reserve of 300 additional men, with 50 tractors, 25 or 30 water wagons and 50 pumps pouring water into 30,000 feet of hose. Tying the whole group together is Radio Roxy's voice.

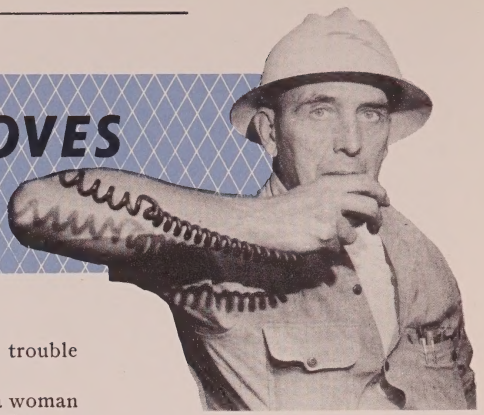
Based on five highly successful years of operation, a lesson is readily seen in Roxy Radio. It is this: *a co-operative radio system serves the needs of small and large companies very well,* at lower cost and with better utilization of radio frequencies than would several individual company systems. At the same time, the party-line hookup gives Roxy great strength when an emergency arises requiring joint action by logger members.

Little wonder Southern Oregon's woodsmen are sold on 2-way radio and say they couldn't get along without it now. » » »

This pick-up truck is one of the 10-watt mobile stations which communicates through Radio Roxy.

Atop Roxy Anne Butte, this unattended building houses the base station and control link transmitter/receiver.

POWER RADIO IMPROVES WITH CONSTANT USE



As a safety factor, radio enables men to contact the load dispatcher prior to line cutover.

Within fairly broad rules laid down by the Federal Communications Commission for the Power Radio Service, each licensee works out an operating procedure for his mobile radio system according to his interpretation of the rules. How much he benefits from radio communications depends on how well the radio is integrated into his operations.

Some utilities deprive themselves of radio's full value by reserving the radio system for emergency use only, or by permitting undisciplined radio operation.

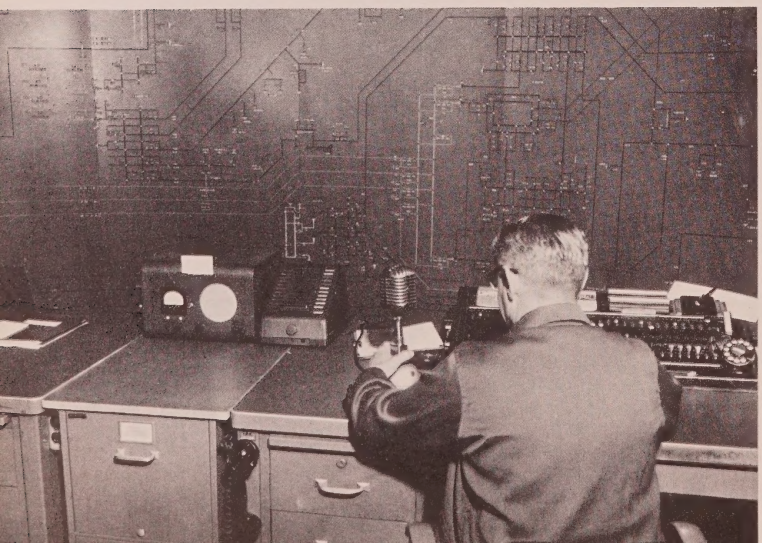
Others, like Illinois Power Company, Decatur, Ill. believe in using mobile radio for all it is worth. Far from saving the radio for emergencies, they use it for just about every job where the elements of time, miles or safety are concerned.

Illinois Power organized its radio system on a local service area basis, with a central base station in each of the 15 service areas functioning as the controller for construction, line and trouble trucks in that sector.

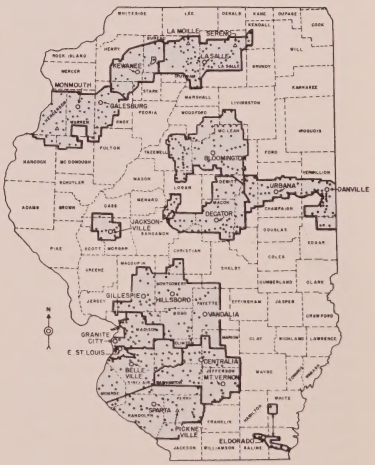
At each service center, a woman clerk operates the radio and keeps detailed records of every vehicle's movements. At the start of each work day, supervisors schedule each truck's assignments on printed cards. Copies are sent with the workmen and also kept in a Kardex file near the radio microphone. Foremen or drivers radio the dispatcher at the conclusion of every job and whenever they are out of service.

The money-saving potentialities of 2-way radio were demonstrated very well when a new line was being cut in alongside a highway widening project. Fourteen crews were spread along a five-mile section at branch ties. When all crews radioed ready, the substation operator de-energized the line and grounds were hung on. Then at radio instructions, the separate crews began their change-overs, and as each finished the word was flashed back to the man in charge. Grounds were removed and the new line energized in 90 minutes, at a time saving of approximately 100 man hours. In this single cutover, the radios saved Illinois Power approximately $300, plus the added safety inherent in every man's knowing the status at all times.

Radio makes the trouble men more conscious of their personal safety. Prior to getting 2-way sets, the troubleshooter working alone used to fight the tough situations singlehandedly, rather than leave the job to hunt a telephone and call for assistance. Now they play it smart and radio for help from the nearest crew when they need another man.



System Supervisor Bland Pence talks from Decatur switching center to crewmen concerning lines on which they are working.



Illinois Power Company
Electric Service Area Map

○ Transmitter Δ Repeater

Among other uses for radio link-up are these:

* Ordering material from the storerooms by radio, which spreads the workload of the stock-bin personnel and prevents congestion and long waits during the lunch-time and late afternoon periods.

* In case of accidents, use of the radio speeds dispatching of an ambulance to the scene of the mishap, and it also aids in rushing a crew to the scene to clear up any interruptions.

* During storms, 2-way radio enables crews working miles apart on the same case of trouble to keep in touch and know at all times what the other crew has done to restore service.

* The Overhead Lines supervisor is able to talk with his men about any job, either from the fixed station or from his car. This saves car and gasoline mileage while giving the same results as his being on the job with the men at all times.

* Decatur home office personnel whose supervisory assignments carry them all over the system can call ahead by radio before arriving at any service area, locating the persons they need to see.

* Wire-stringing crews can use their mobile radios to speed the job, especially where visual signaling is impractical.

* Air-patrol of almost 1,500 miles of high-voltage transmission line, with defect reports radioed immediately to the nearest service center.

* In emergencies, when all other modes of communication are disrupted, the radio could be used for point-to-point messages between service areas.

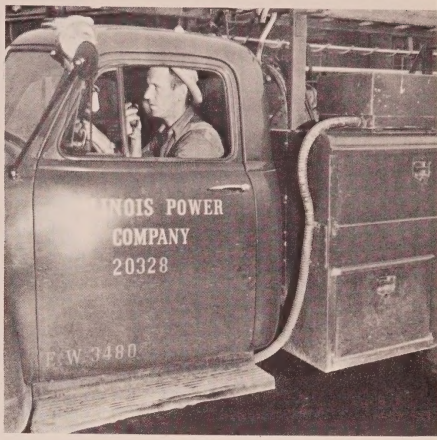
* In the company's gas division, the mobile radios are used to coordinate pressure reduction during time of breaks and revalving.

Radios are quite useful to Illinois Power's Gas Division, and W. H. Hobbs, manager of gas operations, rates them as among his most vital tools. Gas service trucks operate in practically the same way as electric crews, checking in by radio at every stop.

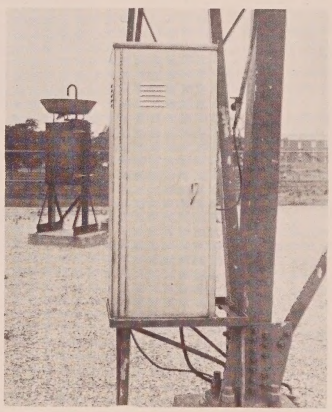
As an example of how radios save money in the gas operation, it formerly was standard procedure to route one truck light in order to keep it available for emergency calls. This reduced the truck's productivity by about 25 per cent. Now, because of radio dispatching, all trucks are available for fast emergency calls.

In six years, Illinois Power's radio network has grown from 193 to approximately 315 mobile stations, and from 12 to 21 fixed stations, including talk-back repeaters for mobile units. It is almost automatic now that every new truck should be radio-equipped because, in the words of the Decatur service area electric distribution superintendent, F. L. Hunt, "a truck without radio isn't worth nearly as much to us."

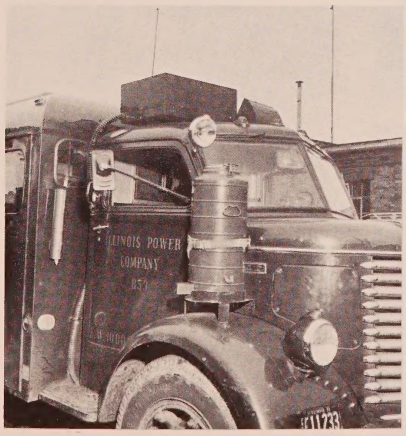
Through well-disciplined operation and constant use, 2-way radio has become an irreplaceable part of this company. Any utility that settles for less effective communications is cheating itself. » » »



Mobile radio unit, mounted in weathertight box behind cab, enables troubleman to call for assistance, report location and check addresses.

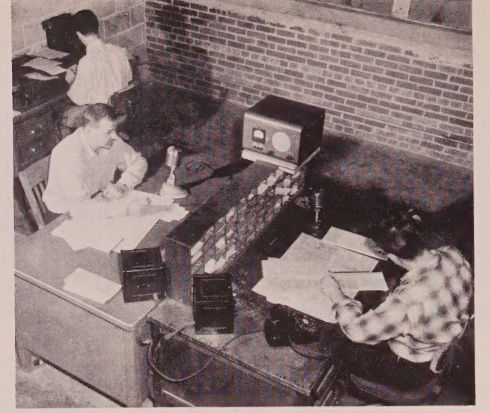


VHF radio base station on 153.65 mc shares a 275-ft. antenna tower with a microwave terminal linking Decatur with Wood River power plant.

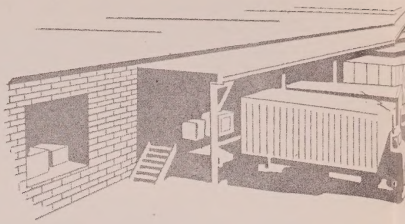


Left, a complete 30-watt transmitter-receiver is contained in housing atop cab where it takes up no usable space in the truck. The 18" antenna is mounted on the radio box, and battery and control cables are fed through conduit to cab.

Right, Dispatcher at Decatur service area checks route card of one of her 33 radio-dispatched vehicles. Lever switch at right on remote control console gives private intercom service with Decatur Load Dispatching office 2 miles away.



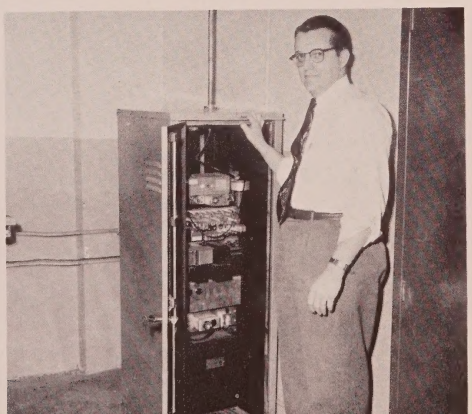
Chief Dispatcher Edward H. Chada (facing right) controls all BT truck pickups from the Cicero Terminal of the Burlington Truck Lines, Inc. Over 2,000 radio calls a day are handled by this base station.



MOBILE R

Driver Larry Tokarski spots a flat on his tractor, and calls for truck maintenance over his Motorola 2-way radio. By speeding maintenance on breakdowns mobile radio saves the BT many payload hours a week.

This photograph, taken shortly after 9 a. m., shows relatively little truck activity. Before 2-way radio was installed, BT vehicles were not able to get on the street so early, and the yard would still be crowded.



Much of the planning of the Burlington Truck Lines 2-way radio system was done by E. F. Hutchinson, C. B. & Q. Railroad Communications Engineer, shown here by the remotely controlled 468.9 mc. base station

Other things being equal, rail shippers place their freight volume where they can get the fastest and most reliable service.

The Burlington Truck Lines is well aware of this because they perform the cartage operation for the Chicago, Burlington & Quincy Railroad in the greater Chicago area, in addition to pickup and delivery work for the truck line itself, which has 5,500 miles of highway operation. This Chicago local truck operation is one of the largest in the country.

When rail freight volume goes up, truck operations benefit accordingly. Therefore, they are just as eager to initiate new and improved operating methods as the parent company.

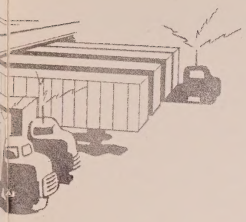
Ever since March, 1954, it has become increasingly clear that one of the new operating ideas put into practice at Burlington Truck Lines is yielding rich benefits in improved service to shippers. This is the 2-way radio dispatching of the 75 city trucks and tractors in the local fleet.

"No one notices the change more than our shippers," says Warren F. Wheeler, Assistant General Manager, Burlington Truck Lines. "To them this new, highly accelerated truck service is exactly what they have always wanted . . . but seldom got."

Before radio dispatching was installed, for example, the BT would miss many of the calls received daily, because the dispatcher's only made contact occasionally with drivers by telephone.

Now, with mobile radio dispatching the score on calls made has soared to 98% efficiency.

How does mobile radio enable the BT to give this better service?



At Burlington Truck Lines . . . .

RADIO BUILDS SHIPPER CONFIDENCE

For one thing, it gets trucks rolling earlier in the morning.

Result: Regular pickups are made earlier, and the schedule for the entire day is shoved ahead.

Once on the street, the drivers check with the dispatcher as they make each stop. New pickup orders are radioed to them instead of waiting until drivers telephone in. **Result:** The interval between call-ins and pickups is drastically shortened.

But it's on rush shipments that the new radio dispatching technique really shows up to good advantage. It's quite common now for a shipper to call in for a pickup, and almost before he has put the phone down to see a BT truck roll into his yard. **Result:** This helps the C. B. & Q. and BTL tremendously in their job of selling rail and truck service. In some instances, the new accounts have grown into five-figure annual freight billings.

Faster truck maintenance is certainly one of the most important benefits of radio dispatching. Figures show that 2-way radio saves at least three payload hours a day because of accelerated service on truck break-downs.

The entire 468.9 mc. radio system was manufactured by Motorola. Dispatcher messages are transmitted over a remotely controlled radio transmitter located on top of the railroad's Chicago Loop general office building. Messages from trucks are picked up on a receiver at the same location. Both incoming and outgoing messages are conveyed to and from Cicero by the railroad phone line facilities. This station talks out clear and loud beyond the outer boundaries of the BT's suburban Chicago pickup and delivery area. A high gain antenna boosts power to about 50 watts.

The 20-watt mobile units in each of the 75 trucks are controlled by press-to-talk switches on the microphones which turn on the transmitters and automatically silence the receivers.

Operationally, the system is simplicity itself. A shipper calls in asking for a pickup. This telephoned order is written on an order slip. Chief Dispatcher Edward H. Chada or his assistant, James Moore, sitting across the desk, then radios a truck in the shipper's neighborhood and gives him the pickup order. Each dispatcher has a microphone, controlled by a foot-operated switch, and the two of them get plenty of use because approximately 2,000 incoming and outgoing radio calls are handled at Cicero each day.

In the relatively short time it has been in use, the Motorola 2-way radio system has more than paid for the initial investment. Radio maintenance has been of negligible expense, and a truck is seldom out of service for this reason. The installation engineering of the system was done by Motorola and E. F. Hutchinson, C. B. & Q. Communications Engineer, under the direction of T. W. Wigton, General Superintendent Communications.

Some of the important ways that mobile radio dispatching has improved BT service can be summarized as follows:

1. It has boosted efficiency on pickups day to 98%.
2. It provides substantial support for the freight sales efforts of the C. B. & Q. Railroad and the truck lines.
3. Two-way radio facilitates fast service on rush shipments.
4. It helps keep errors out of the service, train new drivers better, and avoid confusion that annoys shippers.
5. Two-way radio has put real snap and speed in the road maintenance of trucks.
6. By providing complete control over all trucks 2-way radio has helped to lower operating costs and greatly improve overall operating effectiveness. » » »

First thing in the morning, on the way from the garage to the terminal with his tractor, the driver radios to the dispatcher for dock number where his loaded trailer is waiting, saving considerable time.

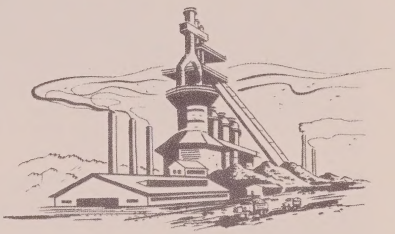
Put Mobile Radio to Work for Greater Plant Safety

In many modern factories today the plant radio system has been integrated into the safety program.

In fact, it is not uncommon to find an entire plant disaster plan built around 2-way radio, to take full advantage of the unique and instantaneous communications performance it alone can provide.

There are at least three major reasons why mobile radio is proving to be such a valuable element in plant safety planning, and each suggests a way of utilizing this potentially invaluable tool.

One is in reporting *instantly* the occurrence of a serious accident to a worker or other crisis such as escaping gas or chemicals, fire, or similar hazards. Since materials handling and other plant vehicles constantly roam the building areas, there is always one radio-equipped unit near the emergency scene to call for help. Perhaps only a minute's time is saved, but often even such a short interval as this can prevent disastrous loss—or save a life.



In the modern factory the entire safety program often is built around mobile 2-way radio communications.

Directing emergency operations is another important safety function which is made to order for mobile radio. With a microphone in his hand the plant emergency director or fire marshal can reach the entire crew instantly, enabling him to utilize all his men and equipment to the very best advantage. A classic example was the explosion at the Whiting refinery of Standard Oil Co. last August.

Another good example of this occurred at the Chicago warehouse and shipping center of Johnson & Johnson. This company, one of the pioneers in modern handling techniques, has nine of its fork-lift trucks equipped with 2-way radio—all of which responded within seconds when a small fire started.

With one of the mobile units acting as the control point for fire-fighting direction, the remaining vehicles forked away tons of stock which otherwise would have been damaged. The quick action, possible because of radio-dispatching, made what otherwise might have been a serious loss a small and almost forgotten incident at the Johnson & Johnson plant.

Despite great improvements in plant safety in recent times, there are still unfortunate occasions when workers are seriously injured and require immediate medical attention. A nearby radio-equipped vehicle can always be counted on to "get through" to the dispatcher instantly. A key man in the plant safety program, he knows how to get assistance without faltering. And there's never a "busy signal" with 2-way radio.

A third contribution of mobile radio to plant safety is in what might be termed "environmental control" when an emergency situation develops. Any fireman,

Make sure that everyone connected with plant safety is thoroughly familiar with your 2-way radio system.

policeman or ambulance driver can tell you he often has to fight the obstacle of a milling crowd of bystanders as much as those he encounters in the emergency itself. And plant personnel, after all, have as much curiosity as the man in the street.

More importantly, when an extreme hazard forces the rapid mass evacuation of personnel from a large building, strategically spotted units of a mobile radio system can work with unmatched effectiveness in avoiding dangerous crowding and panic . . . letting each other know through which exits to guide the evacuated personnel. Any plant safety program worth its salt provides for the rapid and orderly clearance of workers from the premises.

What are some of the important things to do in putting 2-way radio to work in your own plant safety program?

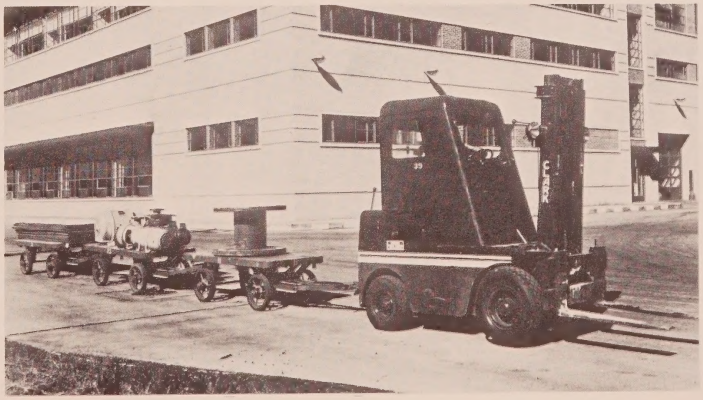
It would be well, first, to examine the disaster and emergency possibilities—fire, flood, earthquake, process explosion, structural collapse, tornado, and of course, personal injury to an individual. Determine exactly what communications problems each emergency poses. Assume, as so often is the case, that the disaster will partially or completely knock out wired plant intercommunications systems. Then, for each type of emergency, you are in a position to decide where your mobile radio units should be stationed and exactly which essential duties each should perform.

Secondly, formalize your use of 2-way radio by snappy group meetings to educate the operators of mobile radio vehicles in their roles as emergency personnel, even conducting simulated emergency drills periodically.

Third, give extensive intraplant publicity to the safety facilities which are available through the central radio dispatcher, so that any key employee can summon help immediately when needed.

Finally, and of paramount importance, make absolutely sure that everyone in your plant connected with your emergency plan is himself thoroughly familiar with the simple operation of the radio units, and that each is fully aware that radio is always available as vital communications help when any kind of emergency occurs. » » »

Highly efficient for routine work, radio equipped plant vehicles can also save the day in a real emergency.



RADIO RULES *at* NAVAL SUPPLY CENTER

The 550-acre Oakland Naval Supply Center as seen from high over San Francisco Bay.

The 10 P.M. fog at the Naval Supply Center at Oakland, California was so thick you could cut out chunks of it with a knife.

Yet Engineer Zeb Cochran, with his 80-ton diesel locomotive, pushed three box-cars that had to be spotted on a Center pier for unloading onto a Pacific-bound freighter. With vision limited to his windshield he had to shove those cars over more than a mile of track, dotted every three hundred yards with warningless street crossings and warehouse switch tracks.

Engineer Cochran picked up a hand mike in his cab and pushed the transmitter button. "Mistress Fox 15 to Mistress Fox 19", he said, "Over." He released the button.

From out of the fog, over the loudspeaker in his cab, came, "Go ahead, Mistress Fox 15."

"How does it look out front?" Engineer Cochran asked.

"All clear for the first 50 yards, Mistress Fox 15," the answer came back. "And the switch onto the main-line pier track is set for you. Take off, but take it easy."

And so Engineer Cochran began his halting trip to dockside with a drag of box cars, guided by a radio voice from the fog. The voice of Mistress Fox 19 belonged to the Naval Supply Center Railroad's Night Dispatcher John Arney, in a radio-equipped truck.

Between them, Cochran and Arney constituted two stations in the five-station radio net that is the nerve center of the Oakland base's 34-mile terminal railroad system. At Mistress Fox 1, the yard office central control in the radio network, a traffic clerk listened in on their conversation, prepared to report to whomever could do most about it, any trouble that might turn up. The other stations belong to the Cen-

Left: By warning an engineer of a blocked track, chief radio dispatcher Warren Beales saves three men from wasting at least half an hour each.

Right: But for McCreery and his radio pick-up truck, it's likely that an engine would have derailed here. The railroad superintendent stops during one of his track inspection tours to warn his yard office of a wash-out.

ter's other two locomotives.

It's a radio system that has been instrumental in establishing for the Center's road a unique safety record. In well over two million man-hours of military supply railroading since Center trains began running as a self-contained Navy operation in 1943, the Oakland Naval Supply Center Railroad has had only two lost-time accidents, neither of them disabling.

The center is virtually all switching yard, and worse than most. From classification yards to docks, the Oakland base's 34 miles of track lace together a 550-acre collection of standard city blocks housing 6,600 employees and well over 150 warehouses and office buildings. The dozens of double grade crossings in such an installation necessarily lack any warning signals other than ordinary visual railroad crossing signs.

The radio net, with the radio-equipped pick-up for eyes, lets Railroad Superintendent Robert McCreery and his assistants clear the tracks and right-of-way of obstructions that would otherwise impair operations and pose hazards. Twice daily—at 8 A.M. and again at 2:30 P.M.—you'll find Superintendent McCreery somewhere on the Center in the radio-equipped truck, patrolling his lines and reporting dangerous conditions to Chief Dispatcher Warren Beales at the yard office control set.

The Superintendent, with his mobile radio, may well have saved the lives of an engineer and brakeman just the other day, when he braked to a screeching halt in front of Building 442, where a major electrical-circuit face-lifting is in progress. He jumped out of his radio truck, took a fast look at his main line track to Pier 4, and double-timed back to his microphone.

"Mistress Fox 1," he told Beales in the yard office, "those double-blasted electrical contractors have laid a 2,300 volt cable right across our main line rails to Pier 4. Keep our trains off until I can straighten this out."

Safety alone justifies the railroad's radio set-up. Added efficiency makes it a cost-cutting investment in dollars and cents. McCreery recalls that within 30 days of installing radio control, operating efficiency had been stepped up 75 per cent. Between 60 and 90 days after the radio truck started roaming the tracks, the railroad was able to cut operating personnel by one-third.

Blocked tracks are the major source of lost time on the railroad. The Center's railroad now averages 125 to 150 switch movements per two-shift day. Whenever a switch movement takes a locomotive down a section of track blocked by trucks in the process of loading, by an emptied box car left standing on an open switch by a mobile car pusher, or by any obstruction, a three-man railroad crew may wait from 20 minutes to several hours to find someone to clear the track.

Thanks to the roving radio truck, these waiting periods seldom happen on the Center. McCreery and his gang spot one to five track obstacles daily, radio the bad news back to the yard office, and either have the obstruction cleared or route rail traffic around it without any delay. That adds up to considerable man-hours saved for useful work.

World-War-II-damaged radio sets built by the Galvin Manufacturing Corp. under the Motorola trade name started McCreery off on the railroad radio trail back in 1942. When he saw the damaged sets coming back from overseas to the Oakland Navy base, McCreery, who had worked for the Southern Pacific Railroad in 1939 when the SP was experimenting with radio control, wondered why the salvage sets couldn't be repaired and installed on the Navy railroad.

He took his query to Commander John Ball (now Rear Admiral, Retired), then Executive Officer at the Oakland base, and Commander Lloyd B. Hughes, (now Captain, Retired), then in the 12th Naval District Property Transportation Office. The trio started making arrangements as early as 1943. In July 1944 a request for equipment went to the Chief of Naval Operations in Washington, D. C. and by early Fall of 1944, the radio installation at the Oakland base was an accomplished fact. » » »

The obstacle path! Without notice, electrical contractors threw a barricade across one of the switch tracks to "protect" a 2300-volt cable.

Upon being notified that a track is blocked, engineer Julious Price radios back that he will go on to the next switching job, return to this one when the track is clear.

No hand signals, no shouting, no running back and forth as HANDIE-TALKIE portable radiophones become . . . .

STANDARD EQUIPMENT for SURVEY CREWS

Field crews for United States Steel's TCI Division also find many other applications for Two-Way Radio.

"Don't yell; broadcast" is the slogan of survey crews at the Ore Mines & Quarries Works of United States Steel's Tennessee Coal & Iron Division. There, in the Red Mountain mining community of Muscoda, in Jefferson County, Alabama, surveyors use Motorola HANDIE-TALKIE portable radiophones to give instructions to their rodmen—the fellows who carry the peppermint striped poles and oversized yardsticks on which the surveyor sights. The result has been a big decrease in hoarse throats and sore feet as the men find it easier to radio than wave, shout or run back and forth over the rugged terrain.

The survey crews are the principal users of the portable two-way radio units. However, in this rugged, isolated area, it is only natural to expect that emergencies would arise in which radio would play other roles. Since acquiring the radiophones, after obtaining an FCC permit to operate on a frequency of 42.98 mc in the industrial band, TCI has found a number of other uses.

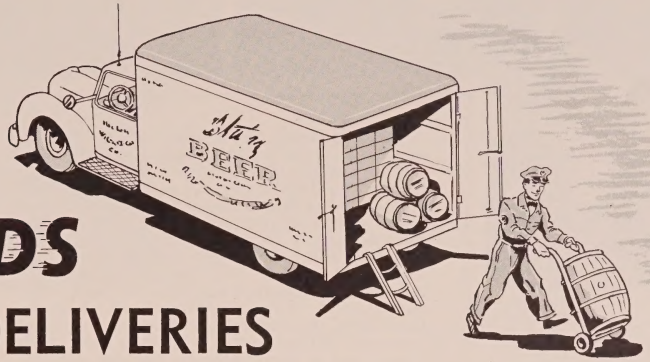
For example, when telephones on Red Mountain went out of order, the ore mines people went to the air. Radio enabled them to keep operations running smoothly until the necessary repairs could be made to the telephone system.

And there was another occasion when it became necessary to blast a drainage ditch at the Dolonah Dolomite Quarry near a road. To prevent danger to motorists, the blaster kept one of the radios and sent two assistants, also equipped with radiophones, to stop traffic during the blast. Just before he set off the charge, he radioed the men to block the road. Then, as soon as the ditch had been cleared, he told them to open the road again. Motorists were protected from the remote danger of flying stone, and yet they were delayed for only a few seconds.

Such varied uses as these have made HANDIE-TALKIE radiophones a regular operating tool for TCI's field crews. » » »

Rodman W. H. Willoughby receives instructions by HANDIE-TALKIE radiophone from his transit man. Willoughby finds two-way radio makes his job easier on both feet and vocal cords.

RADIO SPEEDS BEER DELIVERIES



Pearl Brewing Company of San Antonio has joined the growing list of beverage distributors using two-way radio to cut costs and speed beer deliveries to retail outlets.

Pearl, first brewery in the Southwest to utilize the new communications method, has equipped 19 route trucks and one supervisory automobile with Motorola transmitters and receivers.

"The radios are working out very well," declares Mr. Charlie Clarke, Pearl city sales manager. "Not only are we cutting several minutes time off the average wait for delivery—we also are saving considerably in truck expense and mileage."

A daily record of each driver's route is kept handy in the city sales office. When a beer retailer telephones in an order, the nearest driver is contacted by radio and instructed to make the delivery. It often happens that a Pearl route truck will be within a few blocks of the customer, resulting in fastest possible service.

"Our customers have noticed the improved service since we put in radio, and we have had many favorable comments," adds Mr. Clarke.

Instant contact with his regular route trucks also has enabled Pearl to achieve economies in the use of hotshot delivery vehicles. No longer is it necessary to send out a single-stop truck to fill rush orders, now that the route trucks are readily available. With trucks contacted by radio, the city sales office now exercises much closer control over the driver's work—"It's almost like I am sitting in the cab with every driver," the sales manager comments.

Pearl's two-way radios are licensed by the Federal Communications Commission to operate in the 152 megacycle miscellaneous common carrier radio service. Although sharing the air channel with three other companies, the Pearl city dispatcher talks directly with the truck drivers by means of a microphone and loudspeaker in his office at the brewery. The base station, located several blocks away is remotely controlled by wire line.

The trucks carry 30 watt mobile transmitters which give complete coverage throughout the entire Bexar County. All the mobile radio units are readily interchangeable between 6 volt and 12 volt vehicles, simplifying maintenance and guarding against obsolescence as the older trucks are replaced with new 12 volt models.

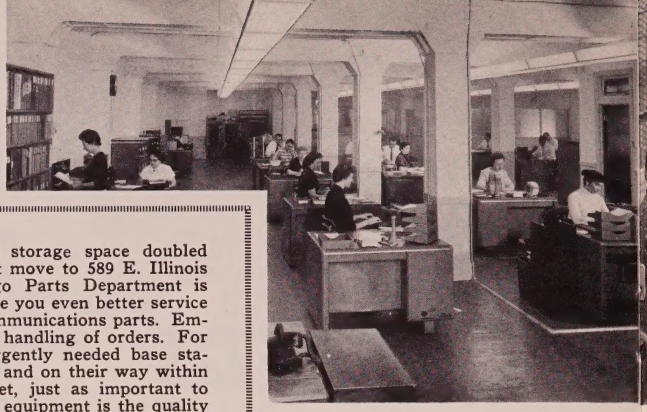
The Motorola radio facilities are leased from J & J Radio Dispatch, and are installed and maintained by the Radio Communication Service Company, Motorola's authorized service station in San Antonio.

"After four months of radio operation, we are convinced the mobile radios are paying for themselves," says Clarke. "Our goal of faster, better service and lower vehicle costs is being met. In fact, radio dispatching has become so much a part of our daily operation now we wonder how we ever got along without it." » » »

Pearl Brewing Company route trucks in San Antonio, Texas are now dispatched by two-way radio. Discussing the new equipment with Driver-Salesman Al Reinhard (holding microphone) are Mr. Charles Clarke, left, Pearl city sales manager; and Mr. Thomas G. Brown of Motorola.

Kits, tubes, vibrators, and other small parts are packaged on this line.

With operating and storage space doubled as a result of its recent move to 589 E. Illinois St., Motorola's Chicago Parts Department is now in a position to give you even better service on factory specified communications parts. Emphasis will be on rapid handling of orders. For example, orders for urgently needed base station parts will be filled and on their way within 2 hours of receipt. Yet, just as important to the user of commercial equipment is the quality of the parts. How all Motorola Communications Parts are double checked by our Incoming Inspection Department is a story in itself (told below) and is your assurance that you will obtain the best in communications service.

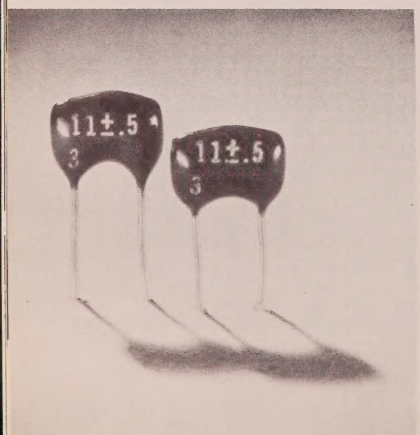


Orders received by the Chicago Parts Department are processed here and then given to order pickers.

Quality Control Is The Difference Between Parts

A question on the minds of many readers is: "If the various parts suppliers buy from the same manufacturers, how can there be any difference between parts ordered from Motorola and those obtained from other sources . . . possibly even from a manufacturer."

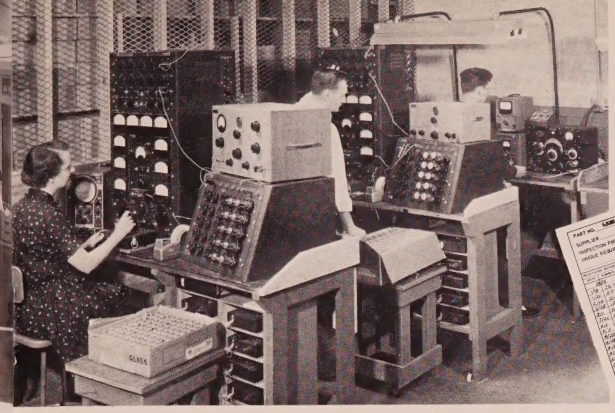
The answer is that the difference is all a matter of selectivity. Every shipment of parts received by Motorola, whether for sale as replacement parts or for manufacture of two-way, microwave and industrial control equipment, is thoroughly screened by Motorola's Incoming Inspection Department. This inspection, plus the initial type approval tests established by Motorola for its suppliers, spells the difference between "communications replacement" parts and standard parts.



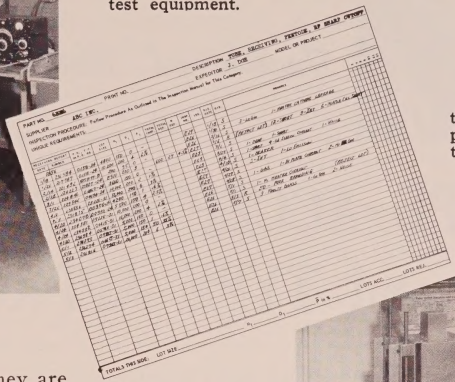
These identical capacitors each meet capacity specifications at room temperature, but only one passed the temperature coefficient test.

Of particular importance to the user of electronic equipment are the type approval tests. Before new parts are purchased from a supplier, Motorola orders small quantities which are subjected to exhaustive tests, both electrical and mechanical. The results are noted on a "history" card which is kept on each Motorola supplier. Only if these parts pass the necessary tests is approval given by the product engineering and production engineering departments. If they fail, the supplier is notified and given an opportunity to modify his production to bring them within the specification limits set by Motorola. This procedure explains why Motorola selects only certain manufacturers, and also how, in the future, other manufacturers may be certified as suppliers of specific parts. Here, then, is the first step in incoming quality control—selection of manufacturers whose own manufacturing and quality control procedures meet Motorola standards.

Unfortunately, even when a part is being mass produced, there is no guarantee that every part will be within desired limits. Perhaps a certain lot will come through with a large number of rejects, or perhaps, over a period of time parts will gradually tend towards the limits of tolerances that have been established. For these reasons, incoming quality control on every lot of parts is standard procedure. This is not to suggest that parts rejected by the quality control department are necessarily defec-



When testing tubes on these universal tube checkers, each valued at $2500, testers first allow tubes to pre-heat for three minutes on equipment at right of each bench. Tube checkers were developed and manufactured at Motorola after many years experience with other types of test equipment.



History cards such as this are kept on every supplier for every part that they supply to Motorola.

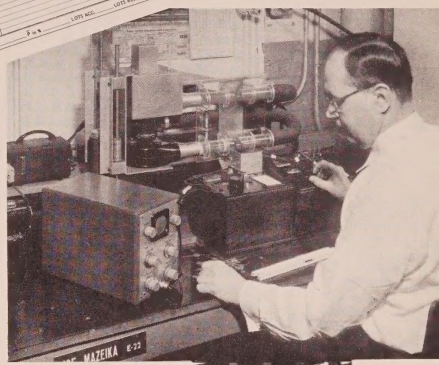
tive; indeed, in most cases they are not. They are generally satisfactory for use where demands on them will not vary greatly, and where failure or poor operation cannot possibly result in a lack of communications that might affect life or property.

For example, consider the two capacitors shown here. Ratings are 11 mmf and 300 volts. When tested on the special, Motorola-built equipment by Incoming Inspection, one was found to have a capacity of 11.32 mmf, the other a capacity of 11.15 mmf. Both were well within the limits of 11.00± .50 mmf specified for this part when used in Motorola equipment.

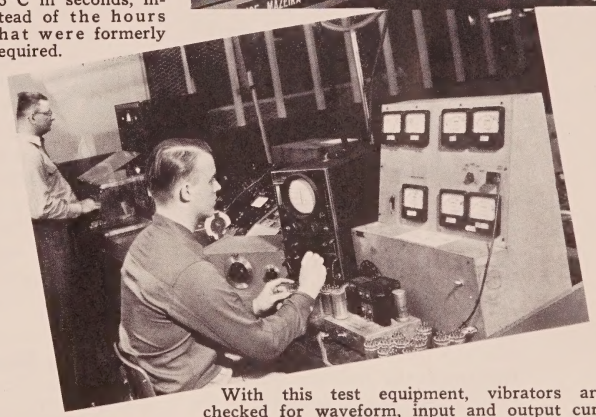
However, one of these capacitors was rejected. At 85°C its capacity was 11.41 mmf and its temperature coefficient (a factor signifying the relative change in capacity with temperature) was 118 parts per million per degree C.—not within the limits of +100 parts and −20 parts. The other capacitor, with a reading of 11.19 mmf at 85°C had a TC factor of 58, well within the limits.

The temperature coefficient test is particularly important for capacitors which will be used in tuned circuits. Excessive change in capacity with temperature can detune the circuit and have a deleterious affect on equipment operation.

In a similar matter, Incoming Inspection puts tubes, vibrators, transistors, transformers, coils, resistors, meters and other electronic parts through their paces. Obviously it is impractical to subject every part in every shipment to such thorough tests. But the quality control procedures imposed by Motorola on all parts shipments, the supplier history cards and type approval checks go a long way towards assuring the serviceman and radio user of the highest quality communications parts. For the user, it means that he can count on getting optimum operation and long life from his equipment. For the serviceman, it means that he has available replacement parts identical with those used originally in the equipment.» » »

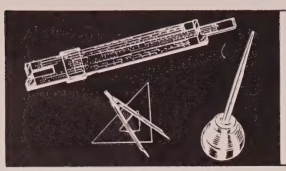


This unusual temperature coefficient capacity checker is so sensitive and accurate that it can be used to measure capacity between two leads. Built by Motorola solely for this incoming inspection test, it permits the checking of capacity at both 25°C and 85°C in seconds, instead of the hours that were formerly required.

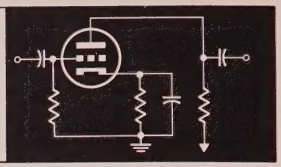


With this test equipment, vibrators are checked for waveform, input and output current, voltage, and other characteristics. In back, at left, high voltage breakdown tests (up to 10 KV DC and 6 KV AC) are run on transformers, capacitors and other components.

At this test position Motorola transistors, used in HANDIE-TALKIE radiophones, the HANDIE-TALKIE Radio Pager and other Motorola equipment, receive six electrical checks. Transistors are aged for one week at a temperature of 85°C.



Technical Notes Section



TYPE ACCEPTANCE and TYPE APPROVAL

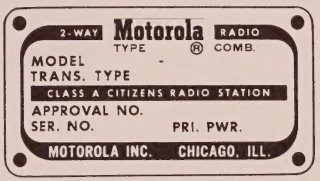
To determine that radio equipment is capable of meeting the standards set forth in its rules and regulations, the FCC has designed two specific procedures for securing advance approval of equipment.

Today, in the United States, with well over a quarter-million mobile radio units in operation, and nearly 800,000 fixed and mobile transmitters authorized, the traffic in applications, renewals and modifications which flows through the Federal Communications Commission offices in Washington has reached overwhelming proportions. To insure that stations operating within its jurisdiction receive optimum protection from the everpresent dangers of mutual interference, and to guarantee the maximum of frequency utilization within the limited spectrum allocated for their use, the FCC must be certain that the performance of the radio equipment be maintained at the highest standards commensurate with prevailing economic factors. To this end, the Commission requires with each application for authorization a detailed technical description of the proposed equipment. The description is limited primarily to the radio transmitter and must contain sufficient information to permit a knowledgeable determination as to its ability to meet the Commission's standards.

Owing to the diversity and complexity of modern radio equipment, individual examination of each application to determine the qualifications of the proposed transmitting equipment, poses a serious problem in both time and manpower. To facilitate this determination, and still carry out its responsibilities, the Commission has designed two specific procedures whereby advance approval may be obtained for the equipment. These procedures are designated as type approval and type acceptance.

TYPE APPROVAL

The only Motorola products subject to type approval are the class "A" Citizens Band (460-462 and 468-470 mc.) equipments. Type approval is normally based on tests performed by Commission personnel at their laboratory in Laurel, Maryland. Application for type approval is made by a letter to the Secretary of the Commission, in which the equipment to be tested is described and which specifies the part of the rules under which type approval is desired. In most cases, the Commission will then direct the applicant to ship the equipment to the laboratories together with operating instructions and circuit diagrams. Upon completion of the tests the equipment is returned to the applicant. Should the equipment fail to meet the Commission's technical requirements, arrangements can be made for modification or adjustment as required.



Each piece of equipment for which type approval or type acceptance is requested must be identified by a type number assigned by the manufacturer. This number must be shown on a name plate affixed to the equipment, as, for example, in the Citizens Radio equipment name plate shown above.

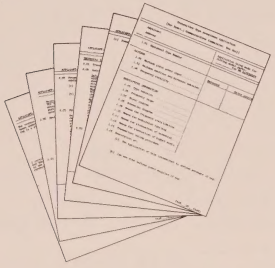
In the event that type approval is later withdrawn, because of a revision in the Commission's standards, or because of some unauthorized change made by the manufacturer, the manufacturer may make no further sale of equipment until such equipment meets the type approval requirements of the Commission.

TYPE ACCEPTANCE

Type acceptance is applicable to transmitters which are to be licensed in the public safety, industrial, land transportation and maritime radio services. It is based on representations and test

data submitted to the Commission by the manufacturer. Unlike the type approval program it does not require that the equipment be tested by Commission personnel. It is, however, subject to check by Commission measurements.

A separate request for type acceptance is submitted for each different type of equipment. The technical data to be submitted is compiled by a qualified engineer who must certify that the application was prepared by him or under his direction, and that, to the best of his knowledge, the facts set forth are correct. Notice to the manufacturer of type acceptance is generally given by postcard, while public notice is given by



Typical Type Acceptance application form contains detailed description and technical information relative to a specific transmitter.

listing the accepted equipment on the Commission's equipment list.

Request for type acceptance, in addition to information specific to a particular radio service, must include such information as: the type number of the equipment, which is assigned by the applicant; the service and rule-part under which the equipment is to operate; and, a complete description of the proposed equipment. The description includes such factors as the type of emission, frequency range, power ratings, voltages and currents applied to the final amplifier, function of each tube, circuit diagrams, instruction manuals, tune-up procedure, a description of the oscillator circuit and any devices used for the purpose of frequency stabilization. When devices are used to limit modulation or suppress spurious radiation, these too are described. In all cases the description must be sufficiently complete to enable the Commission to determine whether the equipment will comply with the technical requirements of the applicable rule parts. Measurements which are made to establish such factors as the RF power output, modulation characteristics, bandwidth occupied, and spurious emissions, must be made in accordance with specified procedures. For this purpose the Commission will accept measurement procedures as advanced by engineering societies and associations such as the I.R.E., A.I.E.E., RETMA and others. Specific reference is made in these cases to the standards used. In lieu of such standards, the applicant must submit a detailed description of the measurement procedure used, as well as a listing of the actual test equipment used.

IDENTIFICATION AND CHANGES

Changes in type approved equipment cannot be made without prior authorization from the Commission. When a change is requested, the Commission will determine whether the change may be authorized, or whether the equipment must be re-identified and resubmitted for type approval tests.

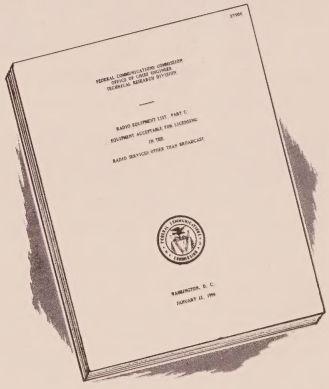
Equipment of the same type is defined as being equipment which is electrically and mechanically interchangeable. Additionally, transmitters of the same type must have the same basic tube line-up, frequency multiplication, basic oscillator circuit, basic modulator circuit, and maximum rated power output.

Changes in type accepted equipment fall into two classifications: permissive, and non-permissive changes. Permissive changes may be made without prior Commission approval; non-permissive changes cannot be made without prior authorization from the Commission.

There are two classes of permissive changes, neither of which may involve change of type, as defined previously. The first class includes those modifications which do not change the equipment characteristics beyond the rated limits established by the manufacturer and accepted by the Commission. There is no need for the Commission to be notified of such changes. The second classification of permissive changes includes those which bring the performance of the equipment outside the originally filed limits, but not below the minimum requirements of the applicable rules. The Commission must be supplied with complete information concerning this second class of changes, prior to the operation of the modified equipment.

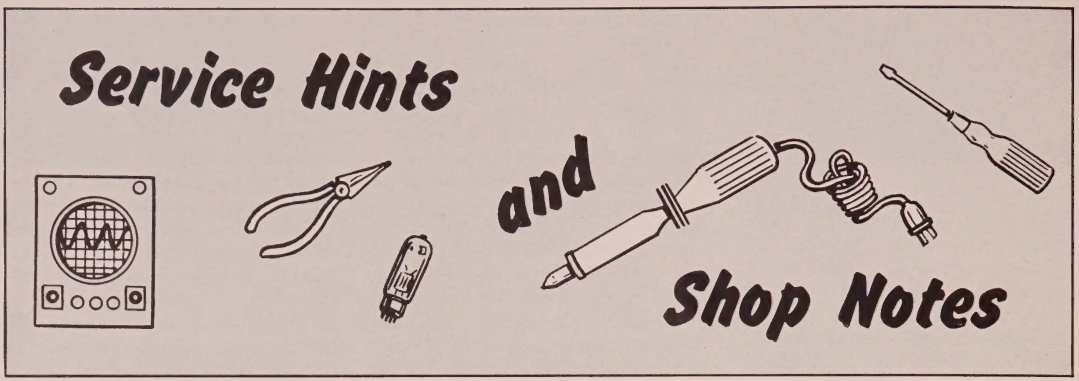
RADIO EQUIPMENT LISTS

Lists of type approved and type accepted equipment are published periodically by the FCC



Radio Equipment List, Part C, published periodically by the Commission lists all equipment deemed acceptable by the FCC.

when there are changes to be entered. Copies of these lists are available for inspection at the Commission's offices in Washington, D. C. and at each of its field offices. Individual copies are not available. **All Motorola mobile radio equipment offered for sale and intended for use in the applicable radio services are included on these lists.** » » »



IGNITION SWITCHING FOR DASH-MOUNTS

If ignition ON-OFF control for 6/12 volt *dash-mount* units is desired, the conversion from a standard installation is easily accomplished by the addition of an "A" relay and three associated cable leads as follows:

1—"A" relay/with associated mounting hardware; Motorola Part No. 59K813674 for 12 volt installations or Motorola Part No. 59B880283 for 6 volt installations

1—4" cable lead/with spade lugs (Motorola Part No. 1V830177)

1—6" cable lead/with spade lugs (Motorola Part No. 1V880286)

1—5' cable lead/with spade lugs (Motorola Part No. 1V847414)

Refer to FIGURE 1. Mount the *applicable* (6 or 12 volt) "A" relay not more than 6 inches from the primary source fuse block using the self-taping screws provided with the relay. Disconnect the mobile unit power ON-OFF cable from the fuse terminal and reconnect it to the "B" or battery terminal of the relay. Connect the 6 inch green lead from the "H" terminal of the relay to the open fuse terminal. Connect the 4 inch black lead from the rear "S" terminal of the relay to a relay mounting bolt. Connect the 5 foot black lead from the front "S" terminal of the relay to the "accessories" contact of the ignition switch.

The control panel will still retain ON-OFF control of the unit with these modifications, but will automatically de-energize when the ignition switch is turned off.

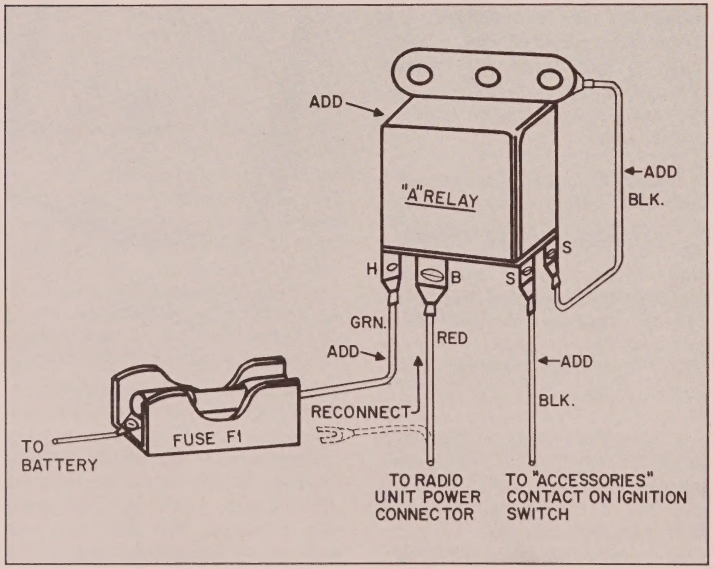


FIGURE 1.
"A" Relay mounting detail for ignition switching of dash-mount mobile units.

HIGH SET VOLTAGE

In 12 volt vehicular installations of 10-inch wide *trunk-mount* radio sets with 6 volt power cabling which has been converted for 12 volt operation, primary voltage at the radio set may be above the design center of the radio equipment. This is particularly true at the high voltage regulator settings encountered more frequently in recent months. Tube life is shortened accordingly. This condition can be easily averted by adding a voltage dropping resistor in series with the power cable to decrease the voltage applied to the radio set. For proper operation, set voltage measured at the power plug should be approximately 12.9 volts for the standby condition, and should not exceed 14.3 volts. The parts required and

the procedure are described below.

1—10 watt, wirewound resistor (Motorola Part No. 17B-832059)

1—Fuse block (Motorola Part No. 67K892616)

1—Jumper, 4", #12 str. (Motorola Part No. 1V830177)

1—Gasket (Motorola Part No. 32A880952)

1—Mounting hardware kit (Motorola Part No. 1V-474596)

Mount the additional fuse block next to the existing fuse block on the firewall of the vehicle. Place the gasket between the firewall and the fuse block and attach the fuse block to the firewall with the two tap screws provided. The washers should be in the following order from the fuse block to the screw head: cushion washer, flat washer, lock washer. Mount the dropping resistor in the fuse block and use the jumper to connect it in series with the fuse in the red ("hot") power lead. » » »

TEST CRYSTALS

Recent advances in Motorola crystal design have greatly improved crystal operating characteristics in the higher frequency ranges. However, not all of the newer crystals can be adapted to the oscillator circuitry of the P-8501 Series Portable Test Sets.

RF crystals: All of the 25-54 mc and 72-76 mc Motorola transmitter control crystals function properly in the portable test sets. Most of the 144-174 mc transmitter control crystals can also be used, the exception being the newer "series mode" type crystals. These "series mode" type crystals are identified by an "S", "M", or "P" as the second letter of the crystal designation, such as "AS" or "RM" type crystals. If necessary the following crystals can be obtained separately for use in the portable test sets (exact frequency must be specified):

144-174 mc: Type R03 (heated) or type A02 (non-heated).

IF crystals: When using AQS or AQLS (455 or 457 kc) type IF test crystals, the ATTENUATOR setting should not exceed the 5 mark on the 0-10 scale. These crystals may oscillate at approximately twice their fundamental frequency when the driving voltage is excessive. This condition is indicated by a sudden complete loss of receiver quieting, but can be corrected by reducing the ATTENUATOR setting as stated above. » » »

RELAY LIFE

In universal 6/12 volt 450-470 mc mobile radios shipped prior to May 1956, the transmit/receive relay K1 in the TU136 Power Supply can be further protected from high voltage breakdown by changing connections to the relay as follows:

From Lug Number	To Lug Number
5	10
4	9
3	8
10	5
9	4
8	3

MOBILE XMTR CARRIER BACKGROUND NOISE

In some 25-54 mc and 144-174 mc 25-30 watt "G" transmitters (Models Series TA104, TA139, and TA201) used in mobile radio equipment shipped after Nov. 1955, the configuration of magnetic fields produced by ground currents in the radio housing and/or vehicle body may create transmitter carrier background noise in the form of vibrator "hash". "Split-channel" radio equipment appears to be the most vulnerable.

This magnetic pickup can sometimes be traced to the black 6-henry choke component preceding the modulator. As a temporary expedient, this noise can be eliminated by jumpering the choke. A more satisfactory solution is to replace this choke with a shielded type which is available free of charge. The new choke is distinguishable from the current black choke by its unpainted tinned external finish.

Replacement chokes can be ordered directly from:

Parts and Service Dept.
Motorola Communications and Electronics Inc.
589 East Illinois Street
Chicago 11, Illinois

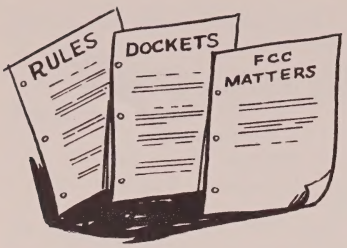
State the Motorola Part Number of the choke (25D850636), the quantity of chokes required, and the *complete* model number and serial number of the mobile radio units for which they are needed. » » »

6146 TUBE SHORTS

Vibrator and/or fuse failure of 25-54 mc and 144-174 mc mobile radio equipment *in 12 volt vehicles* may be traced to cathode to heater shorts in the type 6146 transmitter power amplifier tubes. (The 6146 tube is incorporated in "G" type transmitters: Models TA104, TA139A, TA169 and TA170). This type of short disables a portion of the heater element, but the tube continues to function with nearly normal output.

The gain of receiver tubes can be lowered as a result of filament voltage differentials created by fuse failure from this cause. Poor squelch action and low audio output are noticeable effects of this loss of tube gain.

To check for a shorted 6146 tube, remove the *vibrator* and *heated* crystals from the radio unit (to eliminate the variable heater load). On the power supply chassis, measure the voltage on the 0-to-6 volt filament string (ground to brown fuse wire) and on the 6-to-12 volt Filament String (brown fuse wire to yellow fuse wire). If the difference between the two voltages is greater than 0.5 volt, remove the 6146 tube and check for a short from the filament (pins 2 and 7) to the cathode (pin 1). Defective tubes must be replaced for proper *12 volt* operation of the equipment. Appropriate action has been taken with the tube manufacturer to correct this situation. » » »



F. C. C. BULLETINS

Excerpts from publications of and about the Federal Communications Commission

TYPE ACCEPTANCE REQUIREMENT POSTPONED

Following a request made by the RETMA, the FCC has extended from May 1, 1956 to Dec. 1, 1956 the effective date of the new rules requiring field intensity measurements of spurious radiations to be submitted with requests for type acceptance of radio equipment. The Association had pointed out that further development of measuring techniques is needed. » » »

I.D.C. REQUIREMENT

At present, many earlier-licensed transmitters are legally authorized to operate without a device which automatically prevents over-modulation (a device such as the Motorola Instantaneous Deviation Control, "I.D.C.", circuit). Under the current FCC rules, however, all transmitters authorized or installed after July 1, 1950 are required to incorporate this modulation limiting device. Presumably the licensee of earlier "non-limiting" transmitting equipment will, at some future time, wish to modify his present license. In such case, the applicant must do one of two things: (1) he may choose to convert his earlier equipment to include the modulation-limiting device or, (2) should he choose to continue operating as before, he must make known to the Commission by written statement on his application the number and model of all such units licensed before July 1, 1950 which will be operating less deviation control. In the latter case, the Commission will make known their cognizance of the fact by appending a statement to that effect on the new station license. This statement will also serve to authorize usage. Under no circumstances should the applicant fail to observe one of the two procedures, at the risk of illegal operation.

The FCC has never indicated when authorization for the use of such equipment will be terminated, so long as the licensee remains the same and the license application contains the proper notation. They have made clear, however, that should the license ever be modified without such statement appearing on it, any subsequent request for modification will be turned down until the deviation control provision is installed. » »

FORMS TO BE STUDIED

The FCC has embarked on a study of all forms presently in use in the Safety and Special Radio Services to determine their adequacy and suitability. Special attention will be focussed on the most widely used Form 400 and its related instruction sheet. The Commission has labeled this proceeding Docket No. 11692 and is inviting suggestions as to how the forms may be improved.

The complete list of forms being studied includes: Forms 400, 400-A, 401, 401-A, 403, 404-1, 405-A, 410, 480, 481-1, 482, 501-1, 501-A-1, 505-1, 525, 602, 610, 701, 702, 703, 801, 808, 809, 820 and 820-A.

These forms, in general, cover applications for authorizations in the Public Safety, Industrial, Land Transportation, Aircraft, Amateur, Marine Citizens and Disaster Communications Services. They include also the forms used for simple modifications, requests for additional construction time, antenna modifications, assignment of control, and applications for exemptions from certain compulsory radio requirements.

PERSONNEL CHANGES

In a move designed to further coordination and utilization of personnel, the Commission announced the following changes in its Safety and Special Radio Services to become effective July 1, 1956:

Abolition of the Authorization Analysis Division and Industry and Commerce Division, and the establishment of a new Industrial Division and new Land Transportation Division. The application processing function of the Authorizations Analysis Division will now be transferred to the several service divisions.

Glen E. Nielsen, previously Chief of the Industry and Commerce Division, has been designated Chief of the Land Transportation Division and will be responsible for matters pertaining to Land Transportation and Citizen's Radio Services. Charles R. Weeks will serve under Mr. Nielsen as Chief of the Applications Processing Branch.

Daniel H. Arnold, who has been Assistant Chief of the Public Safety and Amateur Division, is now Chief of the new Industrial Division, which will be responsible for matters relating to the Industrial Radio Services.

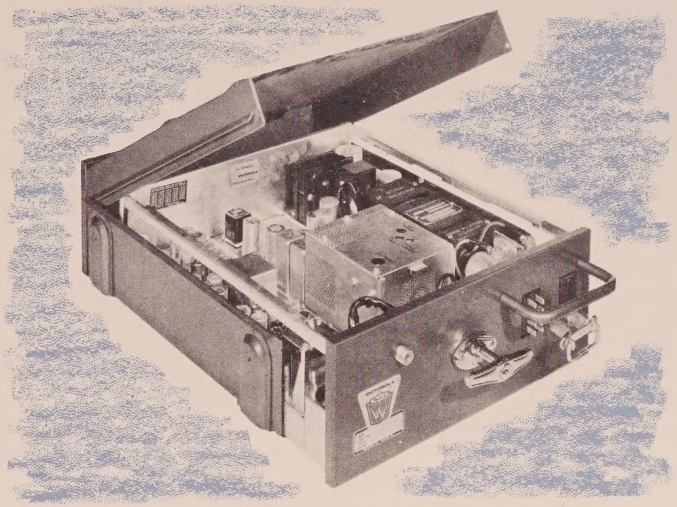
John R. Evans, William N. Krebs, and George K. Rollins will continue as Chiefs of the Aviation, Marine, and Public Safety and Amateur Divisions, respectively.

SPECIAL INDUSTRIAL TAKES LEAD

Statistics compiled as of the end of April, 1956 show that the total number of special industrial "authorized stations" was leading the number of police radio stations by 10,625 to 10,558. This is the first time that the police radio service has relinquished its lead in the number of authorized stations in the safety-special land mobile services.

In the number of actual transmitters in service, however, counting base, fixed and mobile units, the police service still retains a comfortable margin it is believed. The "authorized station" count is indicative of the number of call letters assigned, rather than the number of transmitters involved.

NEW PRODUCTS



100 Watt Mobile Unit

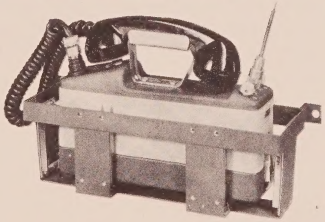
Latest addition to the TWIN-V family of mobile radiophones, this new unit provides a guaranteed 100 watts RF output on any channel in the 25-54 mc, band. Advanced engineering features include a highly efficient dynamotor-vibrator power supply which provides full rated transmitter power output with a power input comparable to conventional 60 watt mobile units. The transmitter is capable of up to 4-channel operation with crystal control of each frequency.

Optimum frequency stability is provided by the new "R" type thermostatically-controlled crystal oven: ±.0005% for the receiver oscillator and transmitter, ±750 cps for the overall receiver including the IF and discriminator circuits. The receiver provides up to two watts of audio output at less than 10% distortion.

The new model incorporates all the proven design and performance features of the TWIN-V radiophone line such as trouble-free universal 6/12 volt operation, the super-sensitive SENSICON receiver with cast-in-plastic PERMAKAY filter for rock stable selectivity and easy split-channel conversion, Instantaneous Deviation Control in the transmitter for voice reproduction, single-scale plug-in metering for easy maintenance, and reserve gain for longer lasting peak performance in the field.

The unit is contained in a compact, rugged 15-inch steel housing designed for trunk-mount installations. Models are available for both standard and split channel operation. » » »

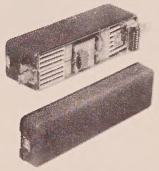
Portable Accessories



Shock-Mount Rack

Accessories associated with Motorola "H" and "P" Series "HANDIE-TALKIE" portable radiophones number more than 20 individual items. Included in this number are the three units described below.

The NK131 Shock-Mount Rack provides an efficient fixed mounting receptacle for "H" Series radiophone units. Mounted easily to most surfaces with only four screws or bolts, the rack not only holds the radio firmly in place but also protects it against damage from excess shock or vibration. Shock pads made from Neoprene sponge and covered with tough Vinolyte plastic are designed for this purpose. The rack's open-frame construction permits the radiophone to be readily inserted or removed and makes straps, clamps, or other cumbersome fastening devices unnecessary.



Battery Cover Kit

The NK140 Battery Cover Kit is a formed aluminum cover designed to match the bottom battery pack portion of the "Handie-Talkie" radiophone and provide a protective covering during storage periods. The snap-fasteners which normally clasp the power pack to the transmitter-receiver portion of the radiophone will also serve to hold the cover securely in place. As many users keep several spare power packs on hand to maintain uninterrupted service from their portable equipment during normal battery maintenance periods, it is recommended that the batteries be covered during these stand-by periods. The NK140 is specifically designed for this purpose.

Controls Locking Kit

The NK141 Controls Locking Kit provides two knurled metal parts internally threaded to fit the extension arms of the radiophone volume and squelch controls. They replace the externally mounted adjustable control knobs when it is desirable to have fixed volume and squelch settings. With the controls set and locked in this manner, any optimum setting can be maintained indefinitely and protected from inadvertant changes. » » »

ADDING NEW JOBS FOR MICROWAVE TO ACCOMPLISH . . . .

COLOR TV RELAY

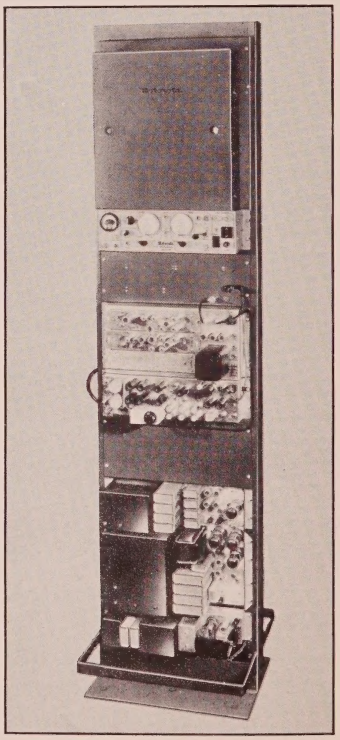
Microwave has become an accepted standard for multi-channel, point-point message circuits in many industries. Utilizing a similar type microwave transmission system, color TV signals are also transmitted via microwave.

The use of wide band microwave for the transmission of TV signals has come into wide use throughout the broadcasting industry. National television networks are dependent on microwave to cover the nation with their programs. Local coverage and local station operation, too, is dependent upon microwave as illustrated by the many applications of MOTOROLA TV Relay Equipment.

Since performance exceeds the stringent requirements for color program transmission, MOTOROLA TV relay equipment supplies a superior medium for monochrome signals as well as color. The equipment is styled into two versions — fixed and portable. Fixed equipment is mounted in standard 19 inch racks for permanent installation and operation between two given points. Portable equipment can be carried to any point, set up, and used to relay the video signal back to the studio or transmitter from either a fixed or temporary remote point. Basically application of these units falls into one of three categories: Fixed, Remote-Pick-up, and Industrial.

FIXED

The studio-to-transmitter (STL) microwave provides the ideal medium for transmitting the high-quality video and audio program signals from the studio to the remotely-located transmitter site. The transmitter in such cases is usually located atop a tall building or elevated location away from the studio. This type of installation is usually a permanent one and employs the fixed rack mounted microwave terminals. Contemplated expansions or relocations of television studios are no problem when utilizing microwave TV relay equipment to interconnect a new studio or transmitter location with the old facility. TV relay can also interconnect two physically separated studios or transmitters with the video and program channel regardless of distance.



Color TV Relay receiving installation showing equipment mounted in 19" rack.

Use of fixed TV relay is not restricted exclusively to broadcast stations. Another use of microwave is community antenna TV systems. There are many sizeable municipalities, especially in mountainous areas, which are so situated that it is impossible to receive adequate television broadcast signals directly. Private organizations within the area are overcoming the obstacle by setting up a television receiver at a remote location suitable for good reception. At this remote point the video and audio signals are taken from the receiver and fed into a microwave terminal. The microwave system carries the signal back to the area in which it is to be viewed, through relay stations if necessary. In the municipality, the television signal is fed to the individual viewer's TV receivers by means of coaxial cable for a fixed monthly fee. Thus, people in areas unable to enjoy conventional TV reception are receiving the benefits of television entertainment and TV listener coverage is increased.

REMOTE PICK-UP

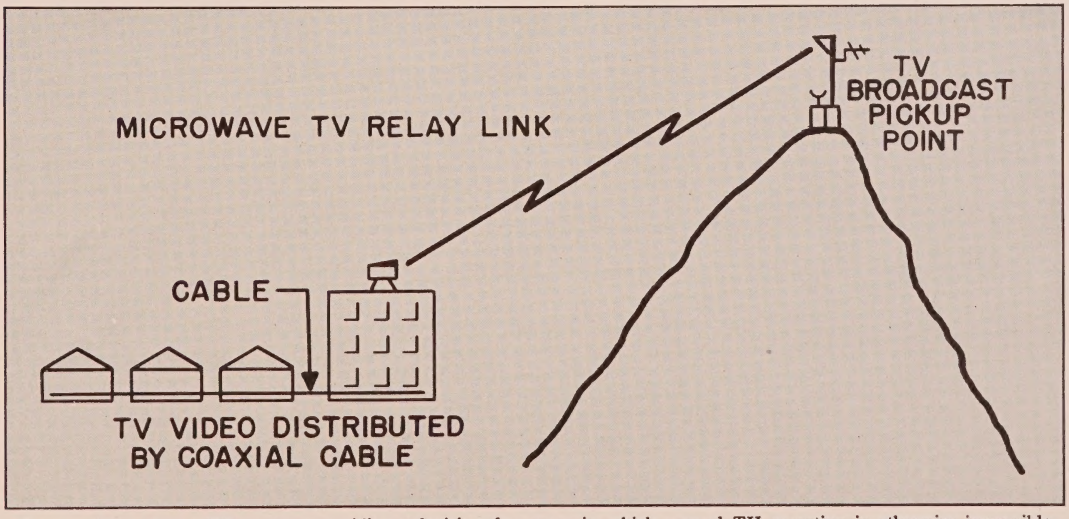
Remote TV pick-ups involve television from some place outside the normal broadcast studio, for example, from a football stadium or baseball park or even from a sponsor's store, office, or shop. MOTOROLA *Portable* TV Relay equipment is designed for such periodic and temporary use. The portable transmitting equipment is packaged in three portable carrying cases. The portable receiving equipment is similarly constructed. The transmitting equipment is set up at the remote location and the antenna directed toward the studio or other receiving site. The portable receiving equipment picks up the program at the studio or transmitter and feeds the signal directly to the control room or transmitter. Portable equipment may also be effectively set up to relay the remote pick-up if a direct line-of-sight path between pick-up point and studio is not possible.

INDUSTRIAL

TV relay equipment may be utilized for closed-circuit industrial TV. Microwave TV relay equipment used in conjunction with industrial television equipment can provide a myriad of applications where dynamic visual presentations must be relayed to other locations. When it is desired to visually monitor a device, area, or operation in a remote location, MOTOROLA TV Relay Equipment can economically provide the connecting circuit between the industrial pick-up camera and the monitoring receiver separated by an appreciable distance.

Industrial television circuits can be run many miles with utilization of microwave TV relay equipment. Such installations can be used by a power system load dispatcher to check readings of meters at a generating station miles away simply by observing the screen of an industrial television receiver immediately in front of him. It can cover car-checking operation in a railroad classification yard.

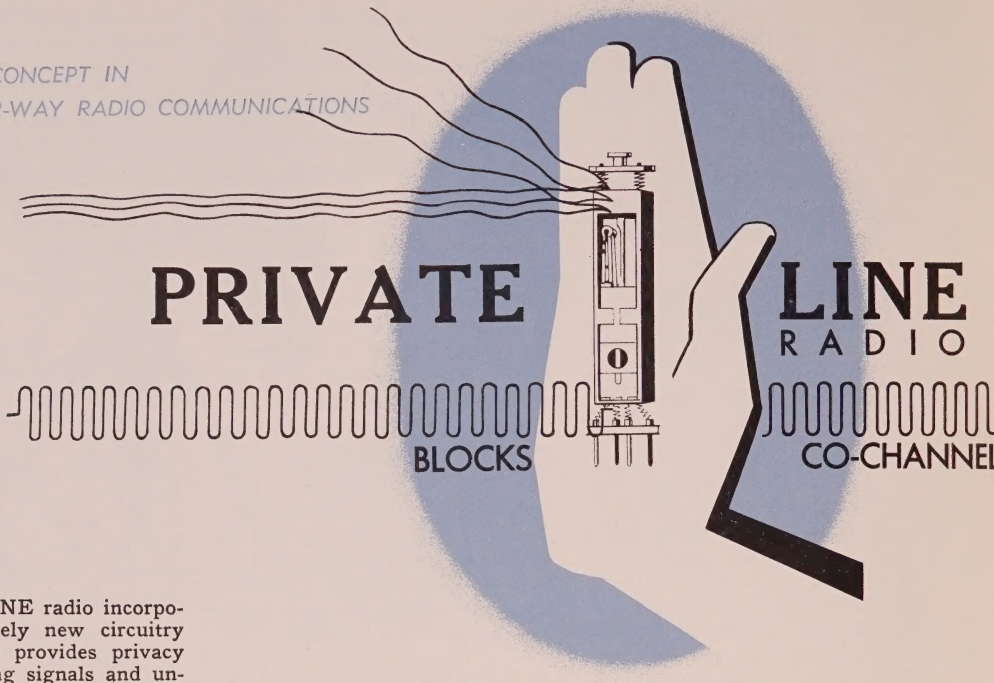
Illustrative of one manufacturing application is the installation at two plants of a leading aircraft producer. Regular conferences are held in engineering, planning and management although the participants are separated by 40 miles. Visual and audible conference attendance is permitted where physical attendance is impractical. » » »



Community antenna TV system providing television for areas in which normal TV reception is otherwise impossible.

A NEW CONCEPT IN
2-WAY RADIO COMMUNICATIONS

PRIVATE LINE RADIO



PRIVATE LINE radio incorporates an entirely new circuitry concept which provides privacy from interfering signals and unwanted co-channel messages. It enables operators to "get off the party line" so that they no longer have to listen to the constant stream of channel chatter over the loudspeaker. PRIVATE LINE receivers are completely quiet except when receiving a call from another PRIVATE LINE radio in the same operation. Even the normal carrier-off noise burst is eliminated from mobile receivers.

FIELD TESTING

Official introduction of PRIVATE LINE radio was preceded by vigorous on-the-job field testing. The first system was installed more than two years ago. Thirty-seven cabs were equipped for around-the-clock operation. Despite the fact that there were approximately 500 other cabs operating on the same channel, users said it was like being on the channel by themselves. Experience with the many additional systems now in operation verifies the reliability and operating advantages of PRIVATE LINE radio.

WHAT IS IT?

PRIVATE LINE radio is basically MOTOROLA's TWIN-V 2-way radio equipment with the addition of a unique audio tone subcarrier system which mutes receivers in the system except when receiving a properly tone-coded carrier. A tone generator circuit is added to the transmitter, and an exclusive "coded squelch" circuit replaces the popular noise-compensated squelch circuit in the receiver.

INAUDIBLE CODE

Unlike conventional tone-pulse selective calling, PRIVATE LINE radio employs a *continuous, inaudible* tone on the transmitted carrier. This tone is at a low level and is below the normal voice frequencies. It is further filtered out of the audio output at the receiver. Interfering signals cannot "trip open" or "lock in" the receiver since continuous presence of the properly tone-coded carrier is required to keep the speaker open.

TONE GENERATOR

The tone generator circuitry is incorporated in standard size MOTOROLA transmitter chassis. A Motorola precision VIBRASENDER electromechanical resonant tone device functions as the frequency determining element in the code oscillator circuit, assuring maximum stability and reliability. The tone is automatically and continuously superimposed on the transmitted carrier in addition to the voice message. The circuit requires no adjustments of any kind.

CODED SQUELCH

The noise-compensated squelch circuit in the receiver has been completely eliminated and replaced by a new and exclusive Motorola development—a continuous tone-coded squelch circuit. Functionally, this circuit mutes the receiver audio except when receiving an on-channel carrier upon which is superimposed a continuous tone of the proper frequency. Nuisance noise, messages from nearby systems on the same channel, skip interference and other "on channel" interference cannot unmute the receiver.

AUTOMATIC

The coded squelch circuit is completely automatic. No adjustments of any kind are required. Optimum receiver sensitivity is maintained at all times, assuring maximum area coverage. The tra-

NTERFERING SIGNALS

ditional manual squelch control is eliminated, preventing loss of receiver sensitivity by accidental or intentional misadjustment. There are no additional buttons, lights, adjustments or operational techniques. Elimination of squelch adjustments makes PRIVATE LINE radio even simpler to operate than conventional two-way radio equipment.

PRECISION

A MOTOROLA VIBRASPONDER electromechanical resonant relay device is incorporated in the coded squelch circuit to insure maximum stability, selectivity and reliability. A tone signal only ±3% from the frequency of the proper tone-code will not operate the squelch circuit *regardless of the level of the recovered tone signal at the discriminator.*

CAPTURE EFFECT

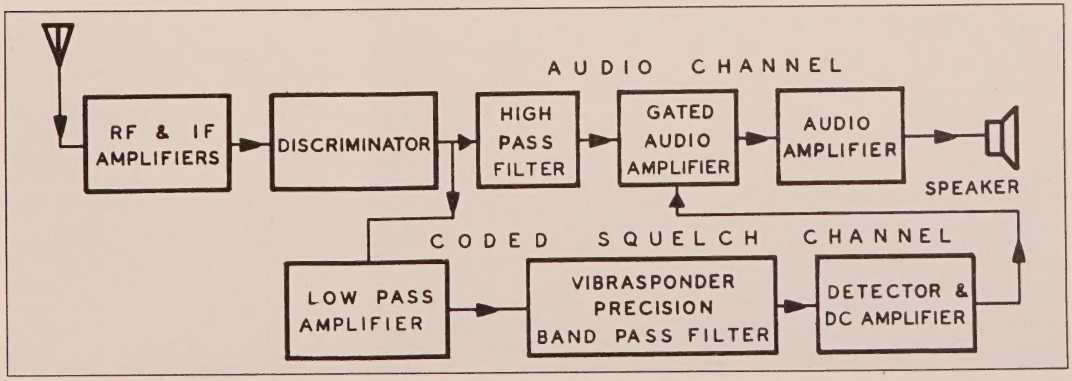
Like any FM receiver, a PRIVATE LINE receiver can be captured by a co-channel transmission which is stronger than the desired signal. However, the unwanted capturing signal will not be heard. The receiver will remain absolutely quiet. The desired signal is heard the instant it recovers the receiver from the capturing signal. Normally, even in the case of same area co-channel operation, the desired signal will be the dominant signal and will maintain communications with the receiver.

DESIGN FEATURES

PRIVATE LINE radio incorporates all the advanced engineering and performance features of TWIN-V radio equipment, including universal 6/12 volt operation, the SENSICON receiver circuit with cast-in-plastic PERMAKAY filter, up to two watts of audio output, optimum frequency stability, Instantaneous Deviation Control and single-scale plug-in metering.

Installation is easy since mobile PRIVATE LINE radios are incorporated in standard 10-inch and 15-inch drawer-type housings. There is no additional equipment or extra connecting cable.

A wide choice of PRIVATE LINE models is available in the 25-50 and 144-174 mc. frequency bands including trunk-mount and dash-mount units; desktop, indoor upright and weatherproof base station models. Optional accessories include the new transistorized dynamic microphone.



BLOCK DIAGRAM "PRIVATE LINE" RECEIVER

TRANSMISSIONS . . .

. . . On Communications Topics

Border Patrol Averts Blast

There was little time to spare when Vance Umphress, senior Border Patrol inspector, drove up to a transport gasoline truck on Highway 67 south of the town of Shafter in Texas. The truck, loaded with 8100 gallons of gasoline, had its right rear dual tire afire.

The extinguisher belonging to the truck was too small to do any good, and Umphress immediately radioed the Border Patrol office in Presidio for help. Two patrolmen drove the 30 miles in record time and managed to put out the fire with a five-gallon Patrol extinguisher. "The fact that Umphress was able to radio to Presidio saved the truck and prevented a serious explosion," said E. B. DeBrail, chief Patrol inspector at Marfa.» » »

No More Traffic Jams

Portable radiophones will be used to prevent traffic jams in London's Covent Gardens market and in the London docks area. The British Transport Commission announced that as a result of successful experiments of vehicle control by radio in London and provincial cities, a two-way radio system is being adopted by British road services to control their trucks operating in the congested market and docks districts.» »

Teamwork

It's good to see many newspapers in small towns giving recognition to the value of two-way radio by their police departments. Speaking of "Those Two-Way Radios," the Milford (N.H.) Journal recently had this to say in an editorial: "A car speeding through Mont Vernon one evening recently failed to stop at a signal from Police Chief Roland E. Christie. We don't know why the driver failed to stop, but we can imagine his surprise as he approached Milford to find the street blocked by the Milford cruiser and two uniformed officers. A few seconds later the Mont Vernon chief arrived on the scene and took over.

This may be a minor example, but it serves to show how those two-way radios are working out, and somehow we find the demonstration reassuring. No longer can offenders thumb their noses at small-town constables. Police officers everywhere are able to work together; a call on the radio can bring the whole team into action."

INS TO COVER POLITICAL CONVENTIONS BY 2-WAY RADIO

International News Service reporters and INP photographers covered fast-breaking political news at the conventions with the help of new Motorola HANDIE-TALKIE portable 2-way radios. News teams and camera crews in widely separated corners of the hall communicated with each other constantly to assure coverage of all important events without delay. As in 1952 when INS and INP first used portable radios, reporters this year were able to cover caucus rooms in outlying areas of the convention hall, and radio in their stories to the rewrite man doing the running story in the press stand, without leaving the scene. They interviewed delegates right from their state delegation sections, and provided much better coverage on special photo and news requests. Shown here checking the new radios are, (l. to r.), Eugene S. Goebel, Vice President, Motorola Communications and Electronics, Inc., William Randolph Hearst, Jr., Editor-in-Chief, Hearst Newspapers, and John J. Reidy, Chief Photographer of the N. Y. MIRROR, and Mobile Radio Coordinator for the Hearst Newspapers, who was in charge of the portable radio network used for convention coverage.» » »

MOTOROLA NAMES OLSON WEST COAST MICROWAVE SPECIALIST

Austin E. Olson has been named Industrial Communications Engineer for Motorola Communications and Electronics, Inc. in California, Arizona and Nevada.

Olson will be responsible for sales activities for the company's microwave and industrial communications products throughout the area, including supervisory control equipment and carrier systems. His appointment was announced by Leonard Walker, Sales Manager for Microwave and Industrial Products.

A sales engineer for Motorola microwave products since 1950, Olson previously served in engineering capacities for Admiral Corp., Hazeltine Laboratories, and Magnecord, Inc. His headquarters are at 811 South "B" Street, San Mateo.» » »

sales service

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TWX: San Mateo, Cal. 999

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HOLLYWOOD 2-1378
TWX LA 871

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Bellevue, Washington
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DAVIS 2-5615
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WEBSTER 0017
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GLENN M. MUNRO, MANAGER
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Cincinnati 36, Ohio
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* * * *

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TWX: LEONIA, N. J. 326

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Washington 14, D. C.
OLIVER 6-4900
TWX Bethesda, Maryland 444

* * * *

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and 4-3809; TWX HO 529

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REGION 404
ROBERT W. PAYTON, MANAGER
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TWX BH 482

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* * * *

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L. HARRISS ROBINSON, MANAGER
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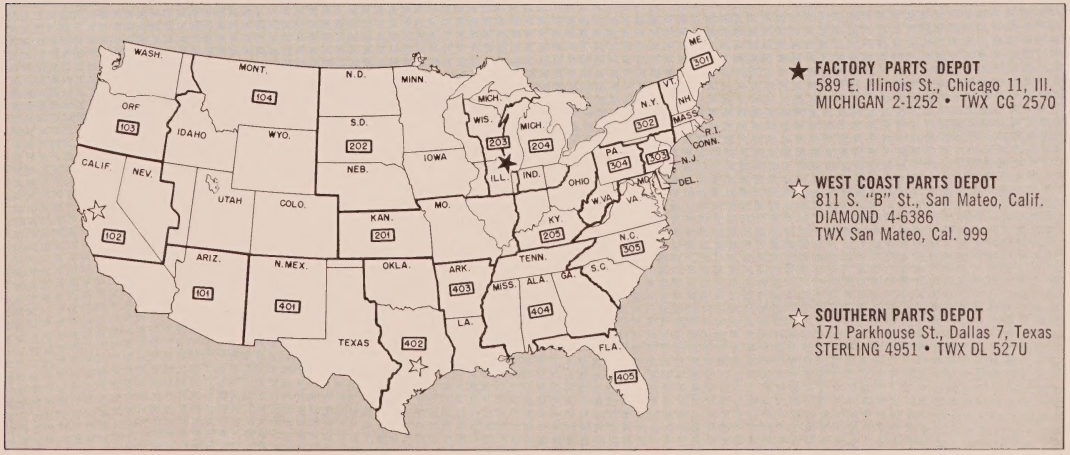

★ **FACTORY PARTS DEPOT**
589 E. Illinois St., Chicago 11, Ill.
MICHIGAN 2-1252 • TWX CG 2570

☆ **WEST COAST PARTS DEPOT**
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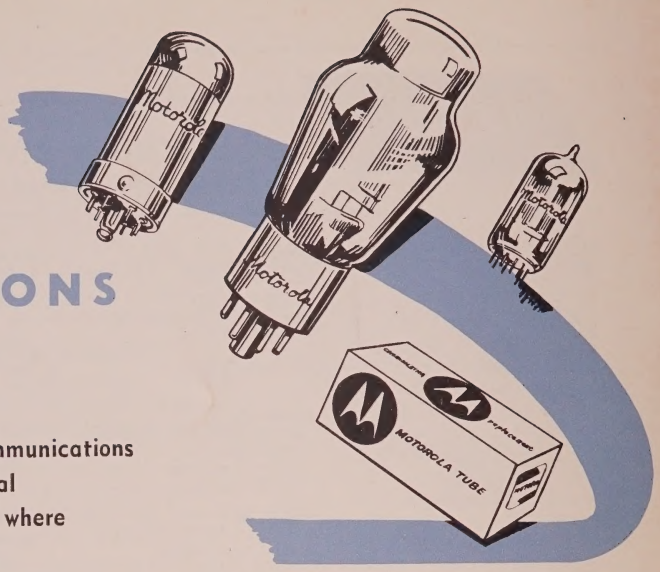
DIAMOND 4-6386
TWX San Mateo, Cal. 999

☆ **SOUTHERN PARTS DEPOT**
171 Parkhouse St., Dallas 7, Texas
STERLING 4951 • TWX DL 527U

THERE IS
A DIFFERENCE IN . . .

MOTOROLA COMMUNICATIONS PARTS



Other parts may look like Motorola Communications Parts - - they may even have an identical ordering description. But, this point is where Motorola QUALITY takes over.

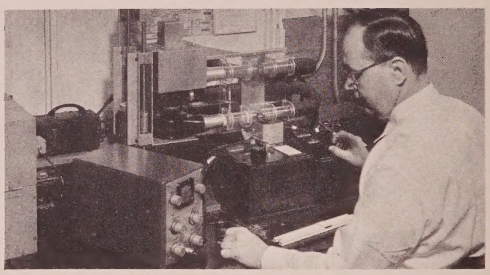
•DESIGN—each component engineered as an integral part of a COMMUNICATIONS system—initially chosen for use where reliability and peak performance are musts.

•CONTROL—each component continuously maintained under engineering surveilance to insure compliance with the initially established strict engineering standards—uniform standards for both original and replacement parts.

Motorola standards cover far more than the usual specifications. New specifications, extended test limits and even new test equipment have been established to verify superior performance of components in the rigid requirements of communications service.

And, it costs you less—competitive pricing plus costs saved in maintenance, longer life and most reliable equipment performance insure more value for your parts dollar.

To realize these benefits, specify Motorola "Factory Recommended" replacement parts, available through Motorola and Motorola Service Stations exclusively.



It takes special Motorola built test equipment to check capacitors against the high Motorola standards.

Thorough component quality control checks include this high voltage breakdown test and vibrator test.

MOTOROLA

COMMUNICATIONS PARTS

MOTOROLA COMMUNICATIONS & ELECTRONICS, INC.
A SUBSIDIARY OF MOTOROLA, INC.
589 E. Illinois St., Chicago 11, Ill.
171 Parkhouse St., Dallas, Texas
811 So. "B" St., San Mateo, Calif.

Engineered for communications service — quality checked for peak performance and reliability—distribution planned for value and service.

Motorola FACTORY RECOMMENDED Replacement Parts—Electron tubes—Resistors—Vibrators... Capacitors—Transformers—Relays . . . Bulbs—Dynamotors—Crystals—Meters . . . Cables—Fuses—Connectors—Wire . . . Coils—Hardware—"Original Quality" . . . parts for communications systems.